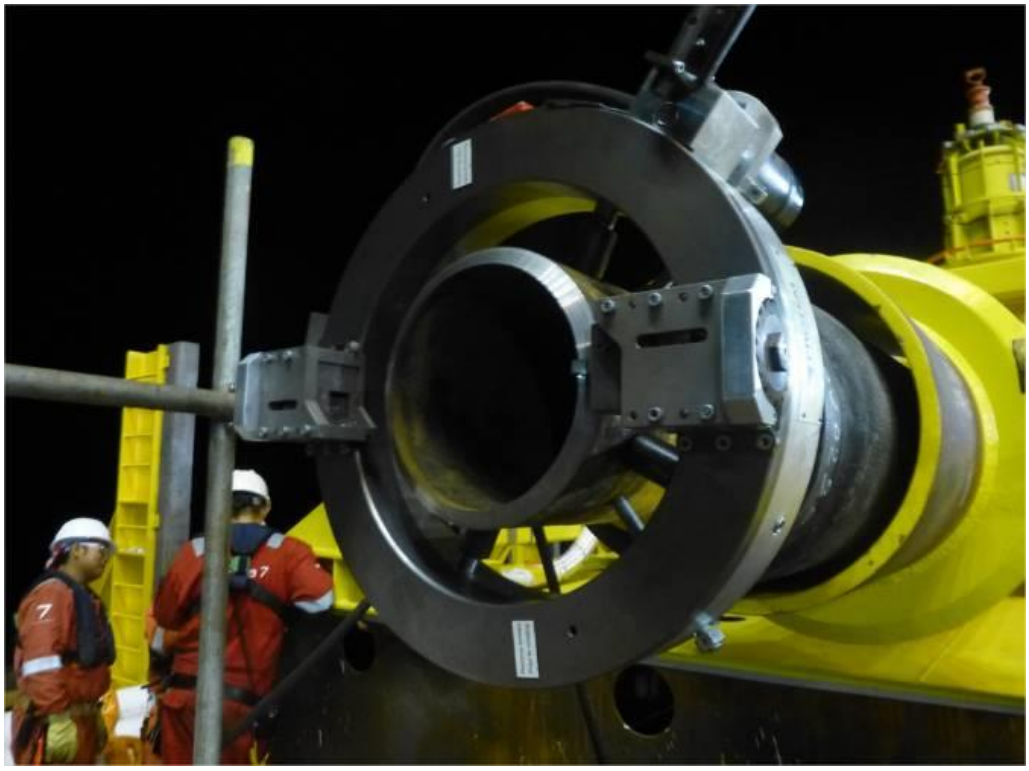
PROTEM
A CUT ABOVE THE REST

Operating and Maintenance Manual

PROTEM TTNG HD
168 – 1016



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A. ENGLISH

The equipment described in this operating and maintenance manual contains information that is liable to be modified without prior notice. This is because the equipment's technical characteristics may be improved or be subject to new developments and/or updates.
This document is the property of PROTEM. It may not be modified, duplicated, or transmitted to third parties without PROTEM's prior written consent.
The purpose of this document is to provide non-exhaustive details on a number of elementary safety regulations to be put into application every time the unit is used. The contents of this document do not replace Labour Code regulations, which must be observed by all operators.

A.1 Safety Instructions

WARNING

INCORRECT or INAPPROPRIATE use of this machine may lead to serious bodily injury!
This operating manual contains important information on the safety regulations that have to be observed. Please read this manual carefully BEFORE using the machine. Keep this manual available for other users so that they may also familiarize themselves with its contents before using the machine. This manual must be kept in an accessible place close to the equipment concerned.

SAFETY INSTRUCTIONS
BEFORE THE EQUIPMENT IS STARTED UP, CLEANED, OR SERVICED, PLEASE READ ALL THE PRECAUTIONS AND INSTRUCTIONS CONTAINED IN THIS MANUAL.

WARNING:
Take all necessary precautions for avoiding any risks of shock or physical injury.
Comply systematically with the following safety instructions:

1. Make sure that your work environment is tidy and has been made safe.
2. **ALWAYS REMOVES ANY WRENCHES OR KEYS BEFORE STARTING THE MACHINE** Always check that any spanners have been removed from the tool before putting it into operation.
3. **ALWAYS KEEP THE WORKSTATION AND WORK AREA CLEAN.** To avoid any risk of injury, never leave equipment close to the workstation, on the bench, or anywhere in the vicinity of the machine.
4. **NEVER USE THE MACHINE IN A DANGEROUS ENVIRONMENT.** Never use the machine in damp or wet conditions and never expose it to rain.
5. **NEVER LET CHILDREN OR UNAUTHORIZED THIRD PARTIES APPROACH THE WORK AREA** Prevent any person not concerned by the operations to be carried out from entering the work area (especially children). Always disconnect the machine before leaving it and make sure that no-one can enter the work area.
6. **NEVER FORCE THE MACHINE.** Your machine will operate much more efficiently and with a higher machining quality if you use it under the conditions and for the operations for which it was designed.
7. **ALWAYS USE SUITABLE TOOLING** Never use a tool or an accessory for doing a job for which it has not been designed.

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8. **WEAR SUITABLE CLOTHING.** Never wear loose-fitting clothing or clothing that is too big for you. Never wear a tie, rings, bracelets, or any other jewelry. They may get caught up in rotating parts. Always wear protective footwear with steel soles and toe-caps. Wear a safety helmet capable of covering long hair and protecting your head.
9. **ALWAYS WEAR SAFETY GLASSES TO AVOID ANY RISK OF EYE INJURY.** Ordinary glasses do not provide sufficient protection. Also, wear a face-mask for improving safety conditions and an anti-dust mask if the work area is exposed to dust, sand, or any other element liable to create discomfort for the operator.
10. **Make sure that hygiene and safety rules are respected by wearing a mask and respecting social distancing. Always maintain a distance of at least 2 meters from any third parties who may be present when using the machine.**
11. **Be sure to clean any surfaces that may have been touched by others before touching them yourself. These surfaces must always be cleaned with a hydroalcoholic product.**
12. **NEVER OVERREACH.** Always keep your footing and remain in a stable, well-balanced position when you are using the machine.
13. **ALWAYS SERVICE MACHINES WITH CARE.** Keep tools sharp and clean for maintaining optimal work conditions and operator safety. Always comply with instructions for lubricating and replacing accessories or spare parts.
14. **ALWAYS DISCONNECT THE MACHINE** before carrying out any maintenance operation or when changing cutting tools or other parts or accessories**.**
15. **NEVER RISK ANY ACCIDENTAL START-UP WHEN PLUGGING IN THE TOOL.** Always check that the ON-OFF switch is in the OFF position before connecting the plug to the mains supply.
16. **ONLY USE ACCESSORIES THAT ARE RECOMMENDED FOR THE MACHINE.** Consult the manual for descriptions of recommended tooling. To avoid any risk of injury, only use the accessories recommended for the machine.
17. **NEVER CLIMB ONTO THE MACHINE.** To avoid any risk of serious injury, do not tilt the machine and make sure that you do not touch the cutting tool by accident.
18. **ALWAYS CHECK THAT THERE ARE NO DAMAGED PARTS ON THE MACHINE BEFORE STARTING UP.** Always check that all the elements comprising the machine are not damaged before using it. Check that moving parts are in line, that they are not out of true, and that they are not subject to any other problem liable to prevent them from operating correctly. Always repair or replace any other damaged parts before using the machine.
19. **ALWAYS CHECK THAT THE TOOL HOLDER ROTATES IN THE RIGHT DIRECTION BEFORE USING THE MACHINE.**
20. **NEVER LEAVE THE MACHINE UNATTENDED WHEN IT IS RUNNING. DISCONNECT THE MACHINE.** Never leave the machine before it has come to a complete standstill. Always disconnect energy supply cables when you are not using the machine.
21. The machine is not designed for doing production runs.
22. Only use PROTEM approved spare parts for carrying out repairs.
23. Always use the right voltage supply for your machine. Incorrect voltage or power supply may cause your machine to operate poorly and cause physical injury or serious material damage.
24. Never try to touch carriages and/or cutting tools before the machine has come to a complete halt and all the different power supplies have been disconnected and/or stopped with the emergency stop pushbutton (depending on the types of machine)
25. **WEARING GLOVES IS COMPULSORY PLEASE READ THE FOLLOWING INSTRUCTIONS ATTENTIVELY AND COMPLY WITH THEM**
    -Even if you are wearing protective gloves, DO NOT touch the cutting edge of tools.
    - Even if you are wearing protective gloves, DO NOT remove chips by hand (chips are sharp and may burn). Use a suitable claw or chip hook for removing chips. Do not forget that you must only remove chips when the machine is at a standstill.
26. Always use adequate stands for making sure that long and/or heavy parts are firmly held in a stable position.

Special safety instructions for this machine:

1. Read this manual carefully and familiarize yourself with safety and operating instructions before using the machine.

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2. Always wear well-fitting clothing, safety footwear with steel soles, protective glasses, and a safety helmet.
3. Always handle the machine with care. If the machine falls or strikes a hard object, it may be distorted or cracked or be damaged in other ways.
4. Stop the machine immediately whenever you notice anything out of the ordinary.
5. Always check that parts are correctly mounted and held in position before using the machine.
6. Always switch the machine off and wait until the cutting tool has stopped rotating before carrying out any replacement, adjustment, or other intervention on the machine.
7. Always make a trial run before using the machine on a new machining operation.
8. Always handle the machine with care when dismantling or reassembling it.
9. Always keep your hands away from the cutting tool.
10. Inspect the machine regularly.
11. If necessary, check that the right cables are used for power supply connections before starting the machine.
12. WARNING: Always use suitable means of handling. Using the machine for lifting other parts (such as pipes or other elements) is strictly forbidden.

WHAT NOT TO DO
TO GUARANTEE THAT YOUR UNIT IS USED IN COMPLETE SAFETY – ALWAYS COMPLY WITH THE FOLLOWING INSTRUCTIONS

1. Never use the machine before you are sure that the contents of this manual have been fully understood.
2. Never leave the machine unattended without disconnecting its power cable.
3. Never use the machine if you are tired, if you have taken any medical drugs or if you have consumed alcohol.
4. Never use the machine for applications that are not specified in this manual.
5. Never operate the machine when you are wearing loose-fitting or oversized clothing, a tie or jewelry, or without wearing a safety helmet.
6. Never allow your hands to get close to the cutting tool.
7. Never touch any moving parts, including cutting tools, when the machine is running.
8. Never remove safety devices.
9. Never damage power cables.
10. When the machine is connected, never try to move it with your finger on the ON-OFF switch.
11. Never use the machine if the ON-OFF switch does not operate correctly.

KEEP THESE INSTRUCTIONS
AND
MAKE THEM AVAILABLE TO OTHER USERS!

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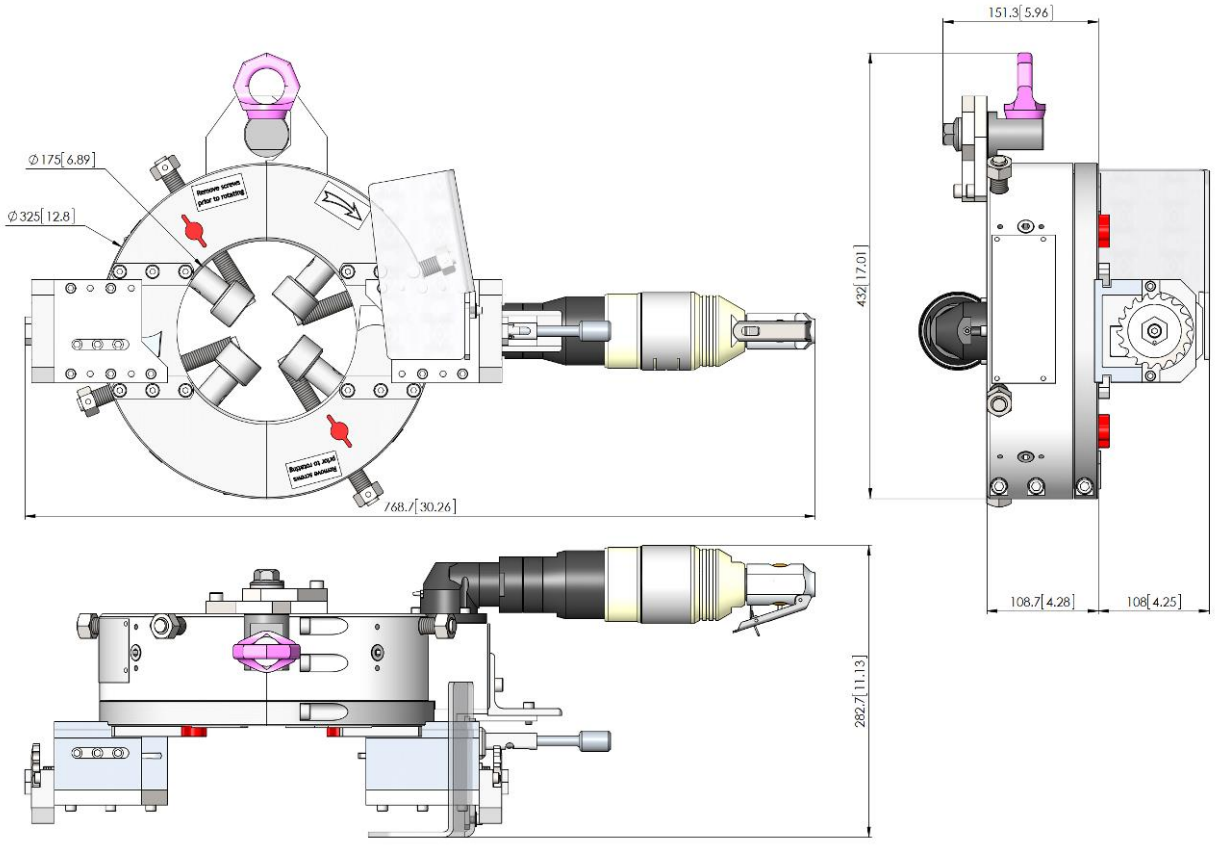
A.2 Description

A.2.1 OUTSIDE DIMENSIONS (MM [INCH])

TTNG 168



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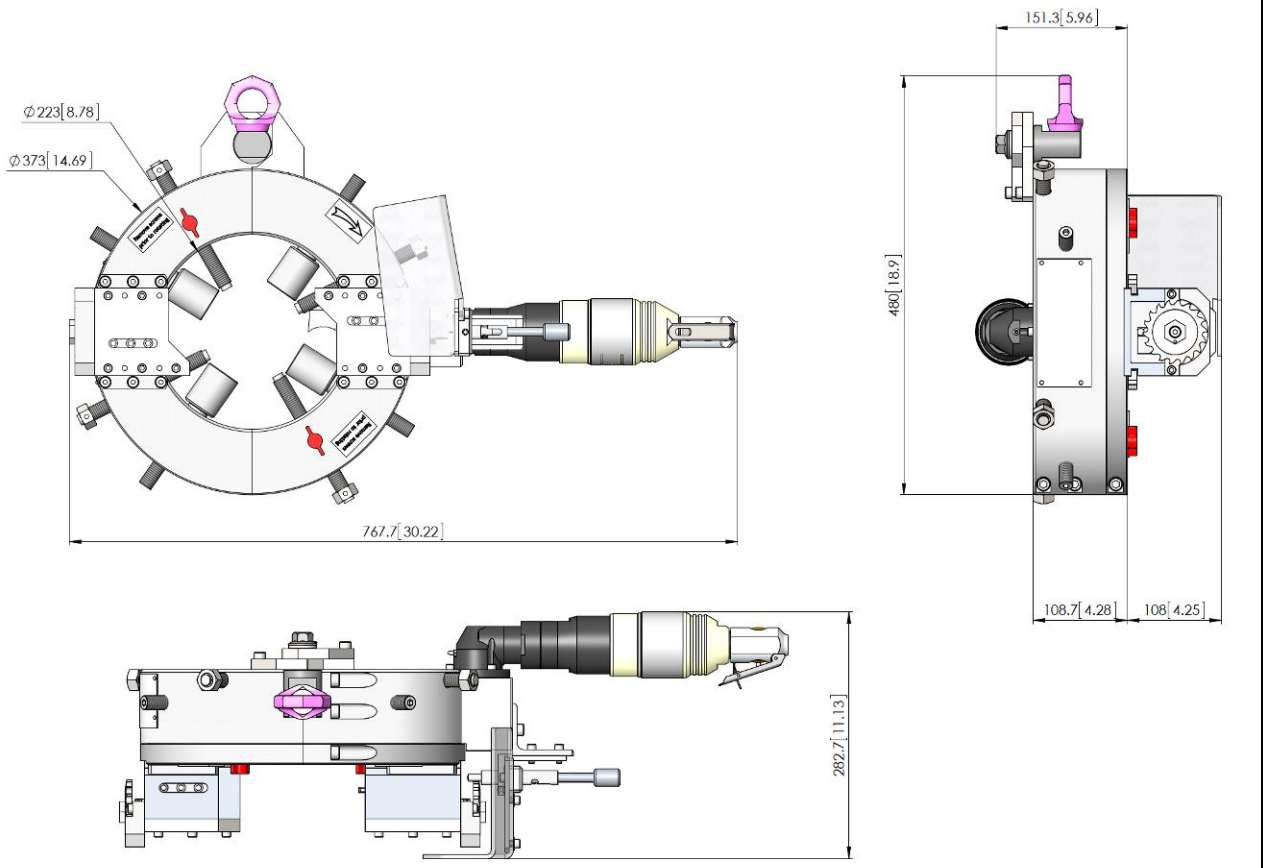
TTNG 219



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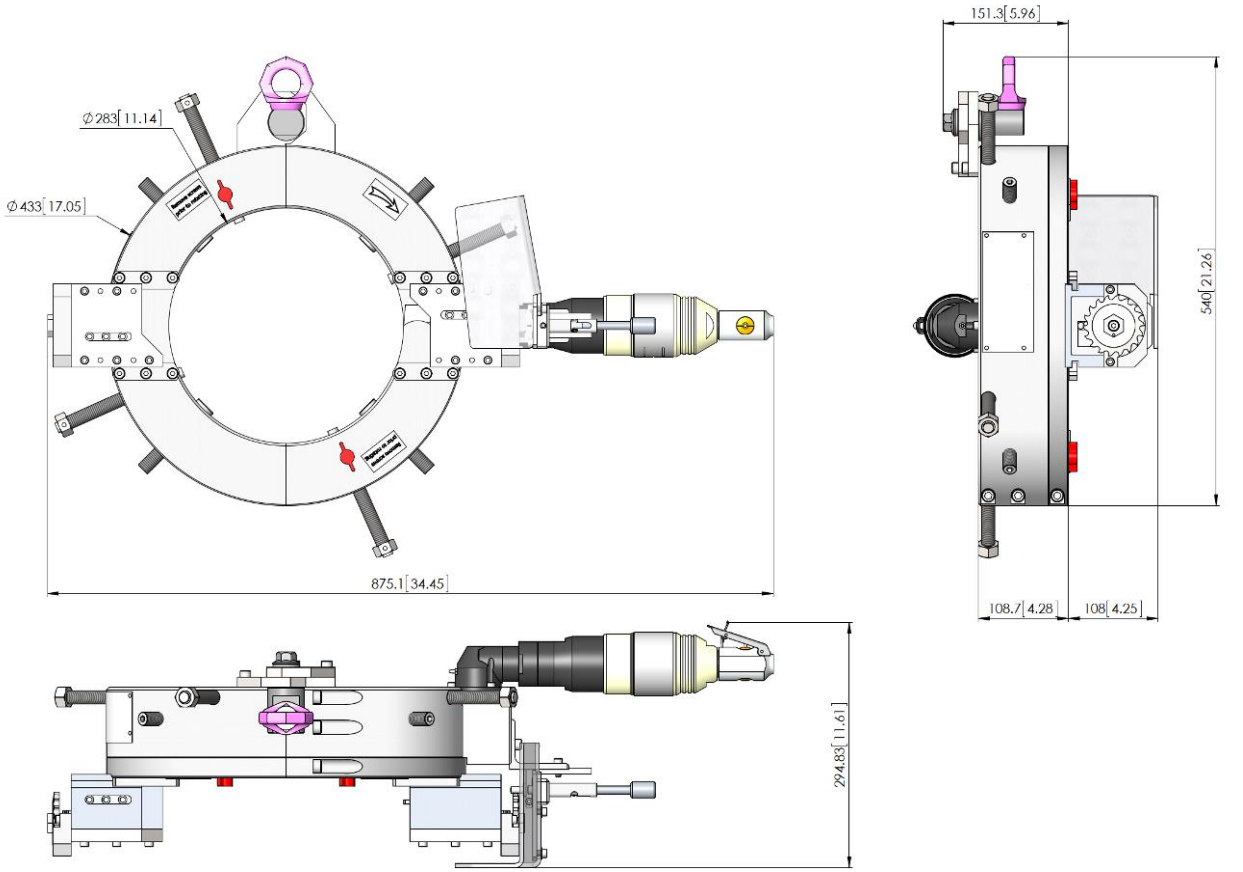
TTNG 273



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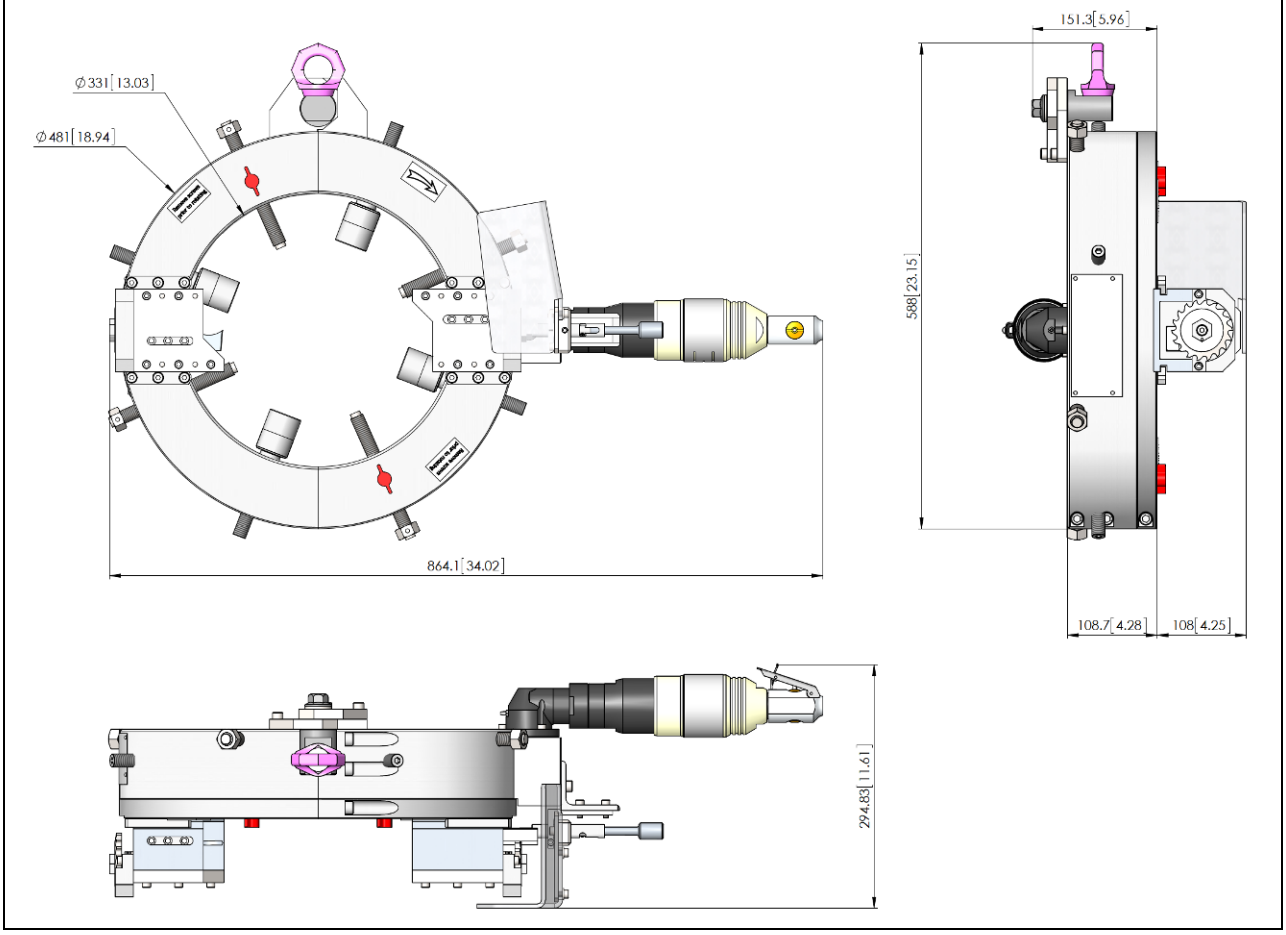
TTNG 323



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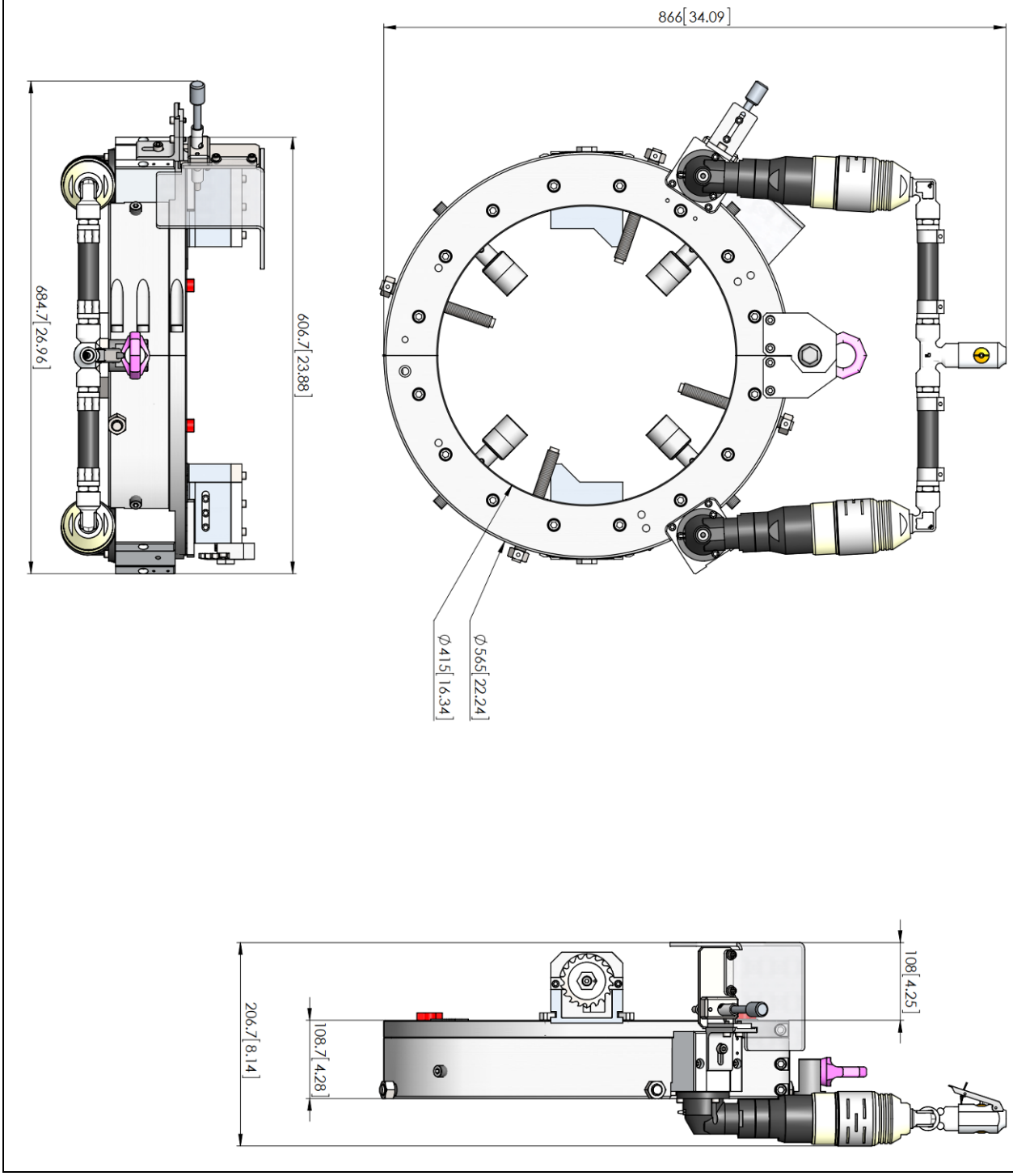
TTNG 406



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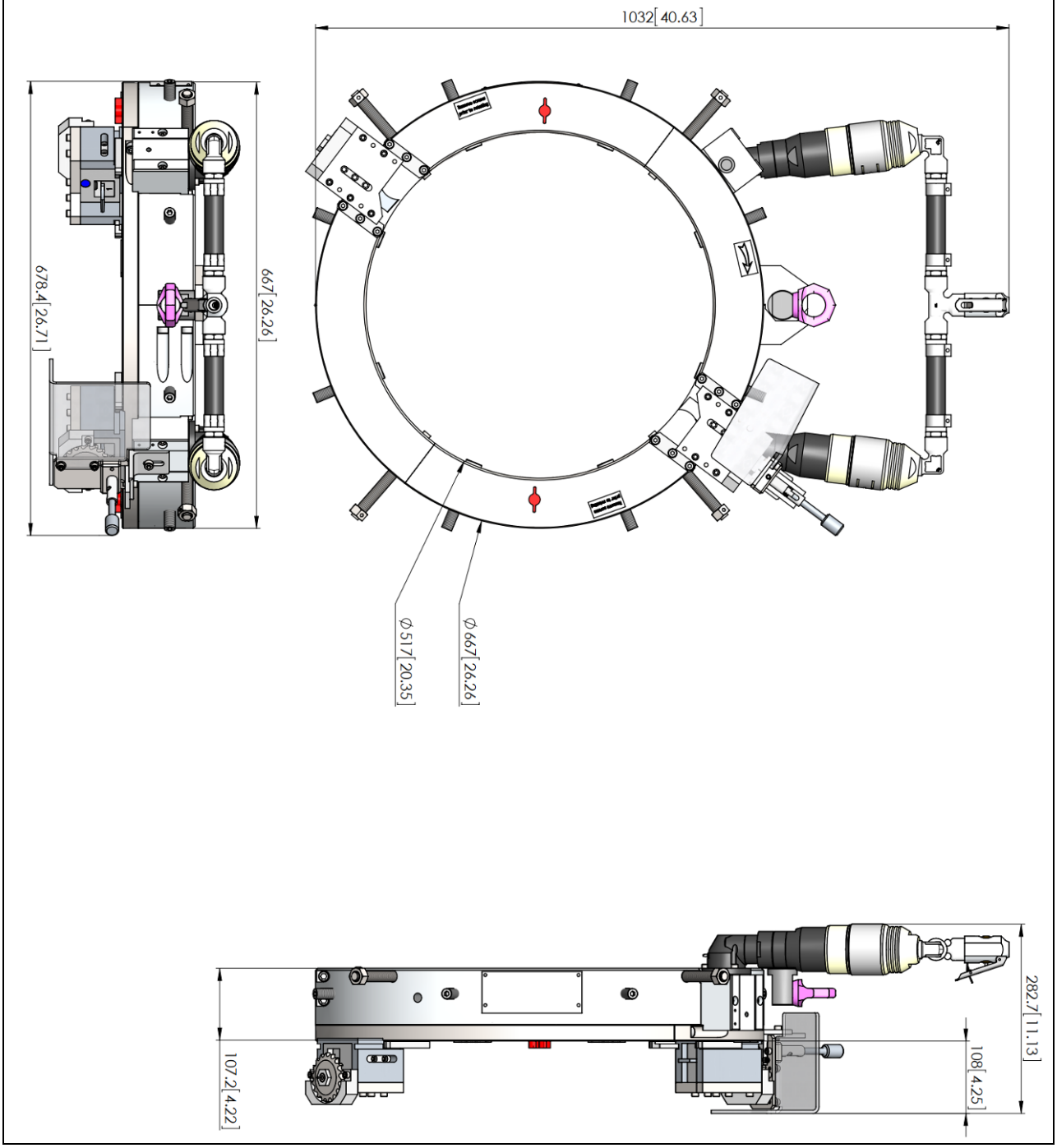
TTNG 508



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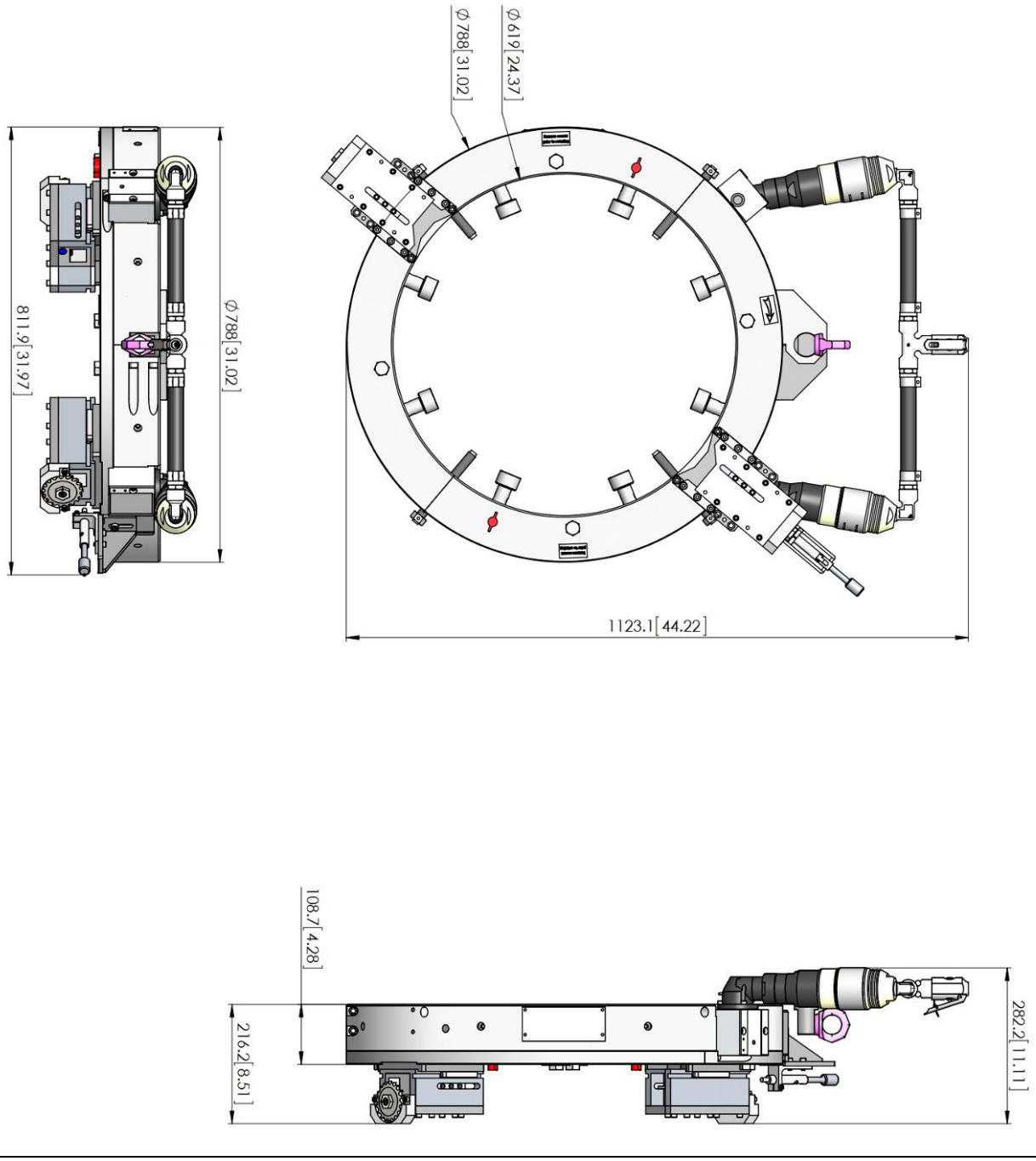
TTNG 610



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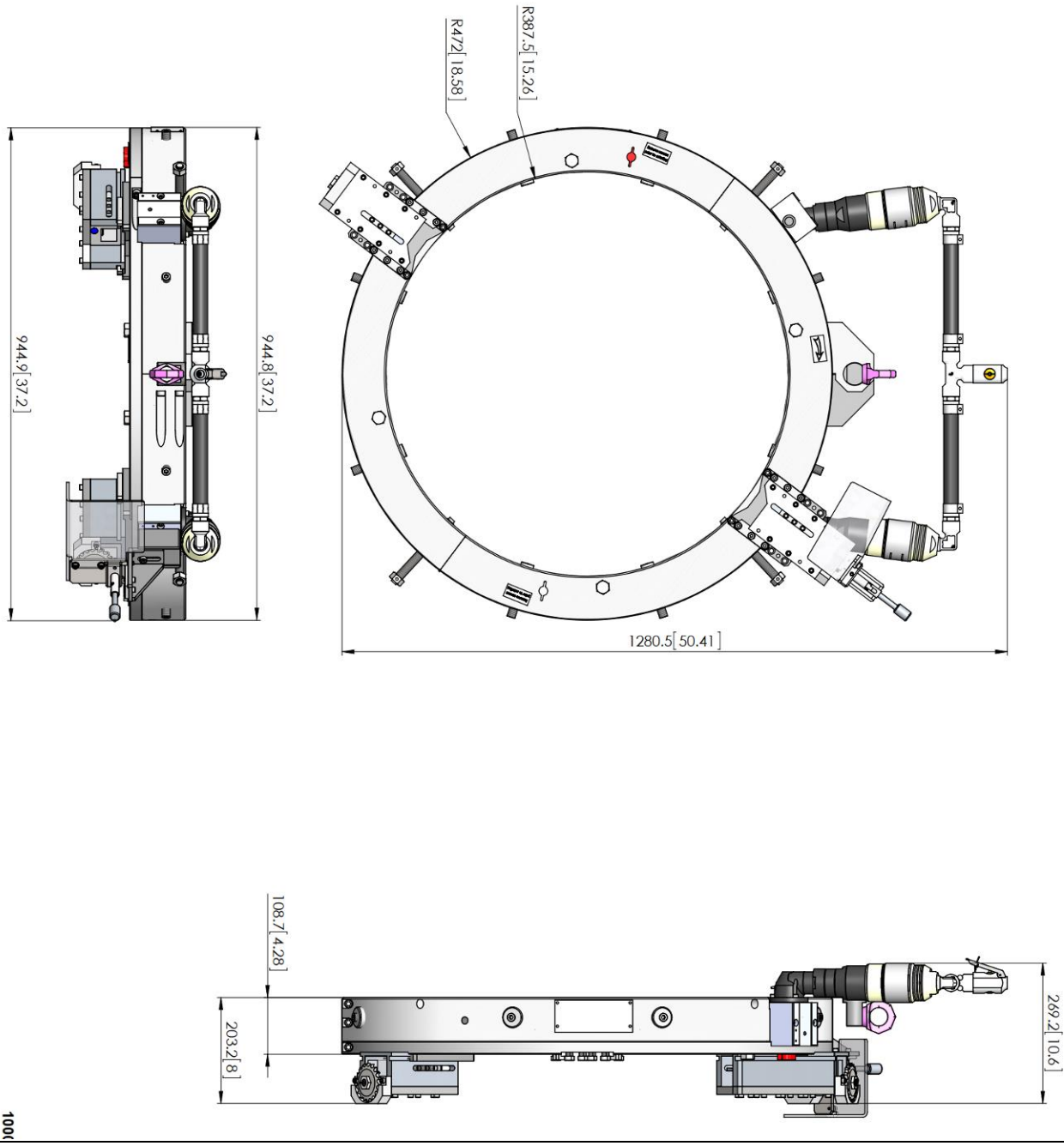
TTNG 762



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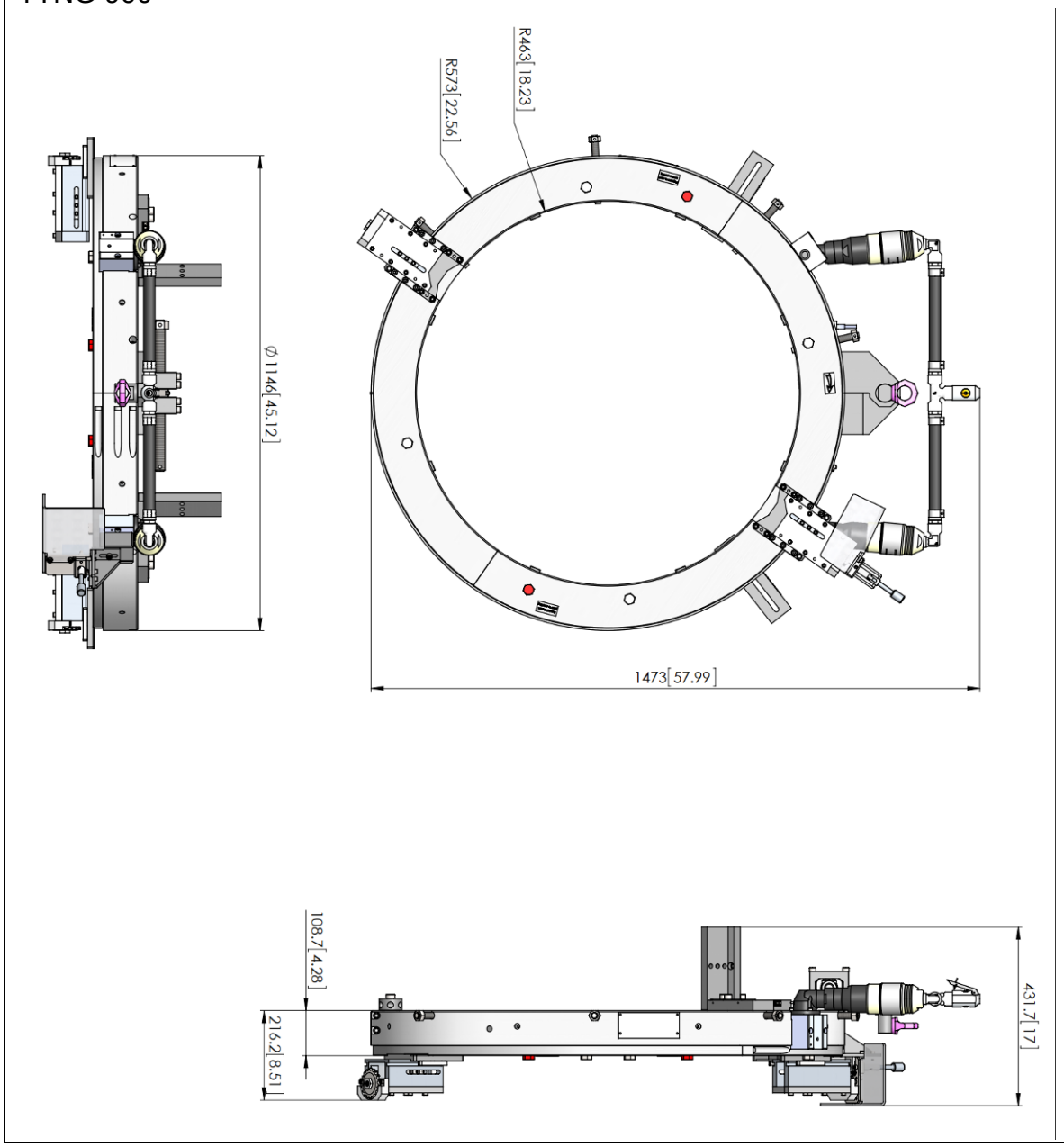
TTNG 900



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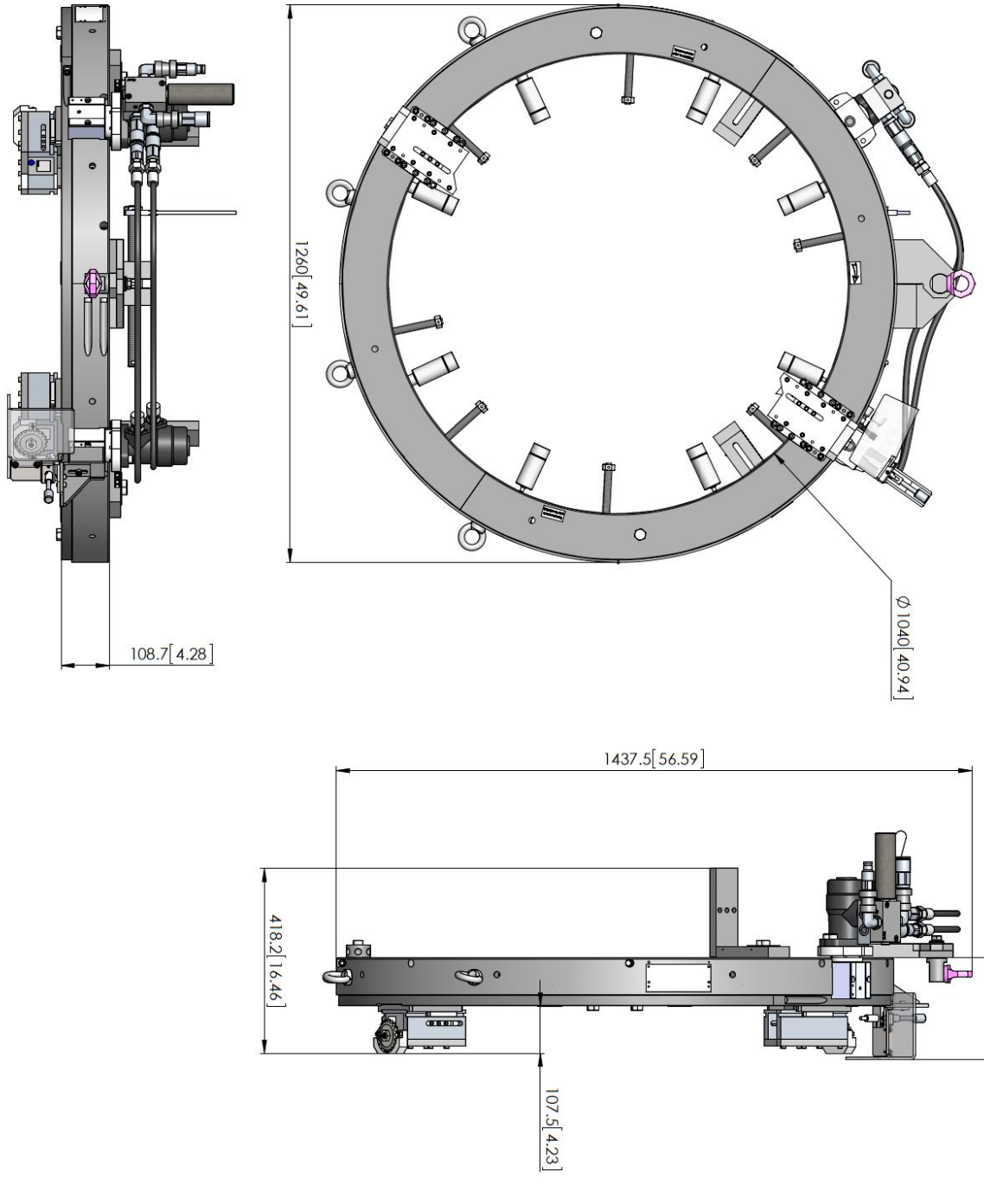
TTNG 1016



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TTNG Model	Capacity in mm	Capacity in inches	Weight* kg (approx.)
168	Ø60,3 - Ø168,3	2"- 6"	46
219	Ø114,3 - Ø219,1	4"- 8"	50
273	Ø168,3 - Ø273,1	6"- 10"	55
323	Ø219,1 - Ø323,9	8"- 12"	58
406	Ø273,1 - Ø406,4	10" -16"	79
508	Ø323,9 - Ø508	12" -20"	88
610	Ø406,4 - Ø610	16" -24"	119
762	Ø558,8 - Ø762	22" -30"	129
900	Ø660,4 - Ø914,4	26" -36"	205
1016	Ø812.8 - Ø1016	32" -40"	366

Weight*:

- Models TTNG 168 to 323: The weights indicated are the weights given for machines equipped with two cutting carriages and one air motor.
- Models TTNG 406 to 762: The weights indicated are the weights given for machines equipped with two cutting carriages and two air motors.
- Model TTNG 900: The weight indicated are the weights given for a machine equipped with two cutting carriages, prepositioning set-squares, and two air motors.
  Model TTNG 1016: The weight indicated are the weights given for a machine equipped with two cutting carriages, prepositioning set-squares, the opening hinge, and two hydraulic motors.

For further details please consult PROTEM's commercial department.

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A.2.2 MACHINING FUNCTIONS

This machine is used for pipes in all grades, more especially for:
- Cutting
- Cutting and beveling
- Counterboring
- Please consult us for other machining operations.

A.2.3 TECHNICAL FEATURES

- **Air motors:** 1 or 2 motors per machine depending on the model.

  TTNG 168 to TTNG 323: 1 Motor RAMO20

Power:	2 HP
No-load speed:	174 rpm
Network pressure:	6 bars (Warning: Never exceed 7 bars)
Compressed airflow:	1,800 L per min.

  TTNG 406 to TTNG 900: 2 Motors RAMO20

Power:	3 HP
No-load speed:	143 rpm
Network pressure:	6 bars (Warning: Never exceed 7 bars)
Compressed airflow:	3,600 L per min.

- **Hydraulic motors:** 1 or 2 motors per machine depending on the model.

  TTNG 168 to TTNG 323: 1 Motor
  TTNG 406 to TTNG 762: 2 Motors
  TTNG 900 to TTNG 1016: 2 Motors

NB: The choice of the type of drive (hydraulic, pneumatic, electric) depends, among other things, on the characteristics of the pipe(s) to be machined (diameter(s), wall thickness(es), material(s), cutting tools, etc.). Ask the Protem sales department for advice when choosing the type of drive you require.

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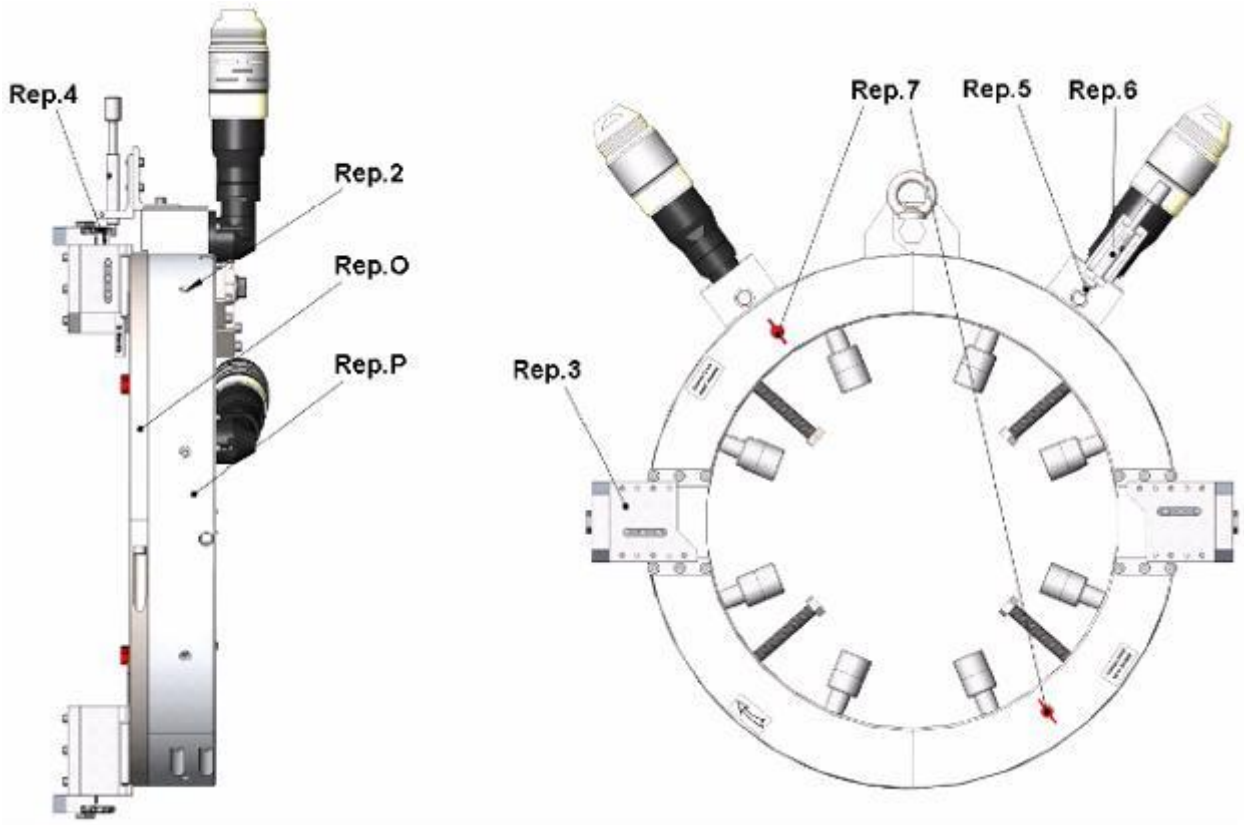
A.3 Operation

⚠	Important information: We invite you to complete the guarantee certificate sent with your machine and/or transmitted by e-mail and then return it to us by e-mail within 30 calendar days of its reception.

A.3.1 DESIGN



This machine has been designed on the principle of a ring with a fixed section and a mobile section.

The machine can be used in two different ways:

- At the end of a pipe. To work in this way, the machine is positioned unopened on the end of an unopened pipe, for cutting overlengths or for beveling pipe ends.
- In the middle of the pipe. For this operation, the machine has to be opened into two sections so that it can be re-closed around the pipe. This arrangement enables parts of piping networks to be replaced.

The unit is fitted onto the pipe by means of two half-units connected together by a hinge.

The unit is clamped into position on the pipe with 4 or 8 jaw-clamping screws (depending on the capacity) (Item 2).

The tool carriages (Item 3) are driven by a gear unit comprising two half-ring gears and one or two drive gears depending on the model. Tools are fed forward by indexing the star-wheel (Element driven incrementally by the retractable finger (Item 5) on the clutch system (Item 6).

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- Cutting speed: between 5 and 12 m per min. (depending on pipe material and diameter).
- Feed: 0.08 mm per rev. with 1-tooth feed
  0.16 mm per rev. with 2-tooth feed

A.3.2 POSITIONING

	INSTALLATION OF THE MACHINE: The constructor may be consulted depending on the type of installation required by the client. Should the installer not be the constructor, he may request the constructor to give its opinions and advice on clamping or any other reinforcement required.

- Carriages (Item 3) must be fully retracted.
- The mating surfaces on the rotating assembly (Item O) and the fixed assembly (Item P) must be in the same plane F for opening the machine into two halves when necessary.
- Depending on the O.D. of the pipe to be machined, fit the appropriate extra jaws when necessary (See Clamping jaw laying-up chart).

NB: When clamping the extra jaws in position with a 6 mm Allen key, use a 5 mm Allen key for holding the base jaws in position (See photo below).

- Retract the base jaws as far as possible (with screw item 2) before putting the machine into position on the pipe to be machined.
- Check that the two red-headed stop-screws (Item 7) are in place for positioning the rotating parts (Item O) in relation to the fixed part (Item P).
- Undo the four fixed part assembly screws (P).
- Undo the two rotating part assembly screws (O).
- Check that the mating surfaces are in line for opening the machine into two.
- Open and reclose the machine around the pipe, checking that the centering studs on the different units are in the right position and that there are no foreign bodies on the mating surfaces.

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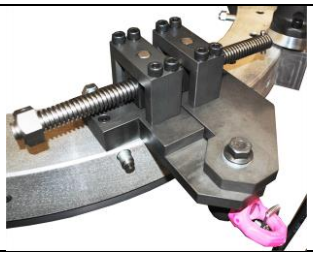
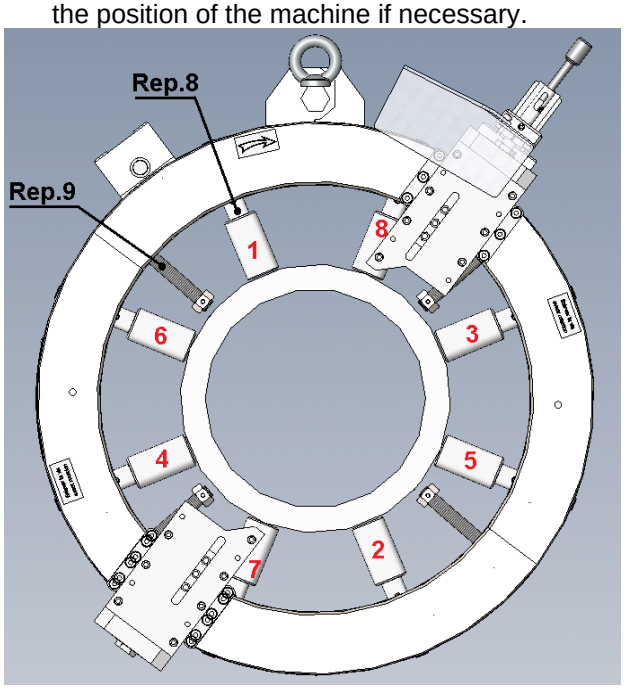
NB:
If the machine is fitted with an opening eccentric and hinge, refer to the “Options” chapter for installing the unit.

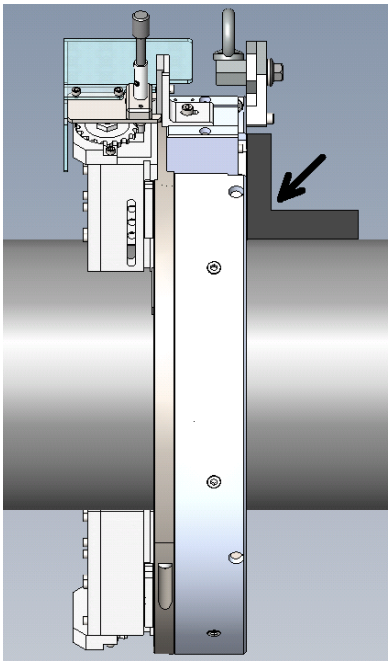


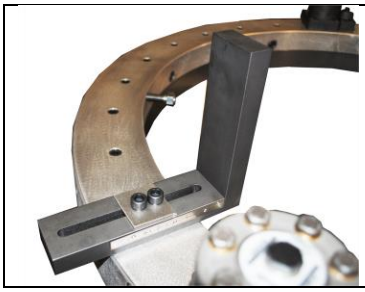
- Screw in and tighten the 6 screws on the fixed and rotating parts.

- **WARNING: Do not forget to remove the red screws (Item 7).**

- Bring the clamping jaws into contact (Item 8) making sure that you comply with the order of tightening defined in the diagram below (cross-pattern tightening, see diagram below). When making this setting, check that the machine is concentric and perpendicular to the pipe. Re-adjust the position of the machine if necessary.







NB:
If the machine is equipped with positioning set-squares, please refer to the “Options” chapter.

- Warning: Take care not to damage the mating surfaces on the half-rings when installing the machine.

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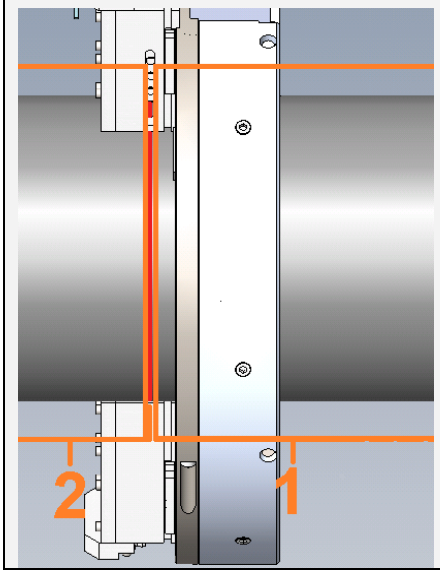
- Lock the clamping jaws in position remembering to comply with the cross-pattern shown above.

Tightening torque on jaws must be no higher than 3daN/m per jaw.

- Then use a 24 mm flat wrench for gently tightening the stabilizing screws Item 9 (firmly in contact).
- After fixing the machine onto the pipe, check that the rotating part turns correctly without any hard spots and without forcing (with the motor removed).



Provide a suitable support system for holding parts 1 and 2 of the pipe before separating the two sections after machining.

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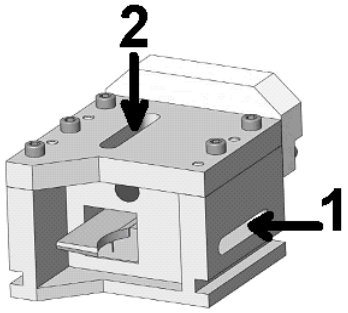
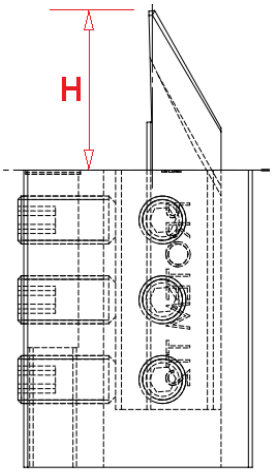
A.3.3 FITTING CUTTING TOOLS

NOTE: Use a 6 mm Allen key for fixing tools in position and tighten as follows:

a. Position the tool + shim assembly in the tool-holder as per the machining configuration that has been chosen.
b. Tighten 3 screws n°1 (firmly in contact, but not fully tightened)
c. Tighten 3 screws n°2 (firmly in contact, but not fully tightened)
d. Fully tighten the 3 screws n° 1
e. Fully tighten the 3 screws n° 2



Warning: Check that the tool and its shim are placed far enough inside the slideway so that the 6 holding screws are in perfect contact with the tool and its shim. For example, for tools TT1, TT2 and TT3, dimension H=43mm.



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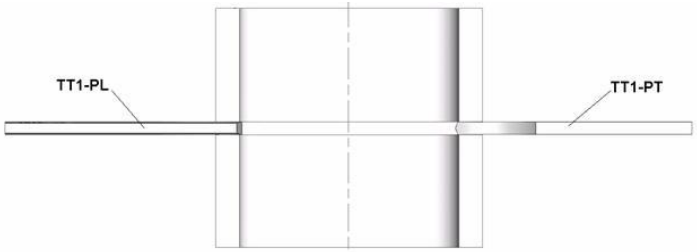
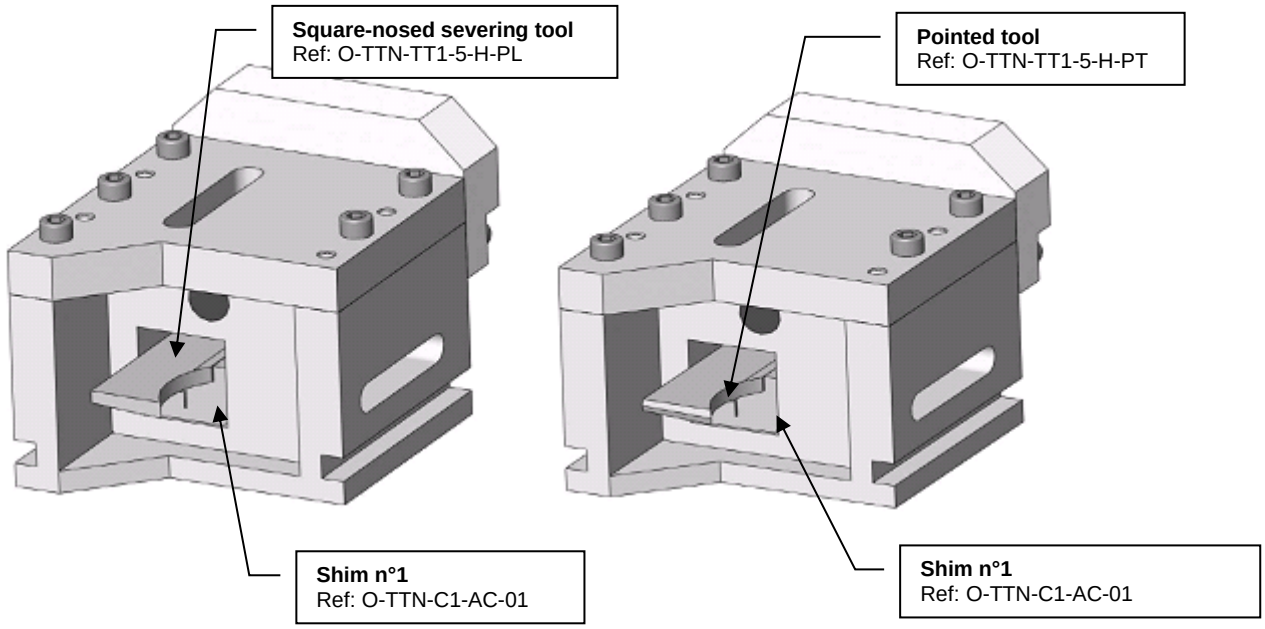
The following machining operations can be carried out depending on the types of tool fitted to the tool-holders:

Straight cutting





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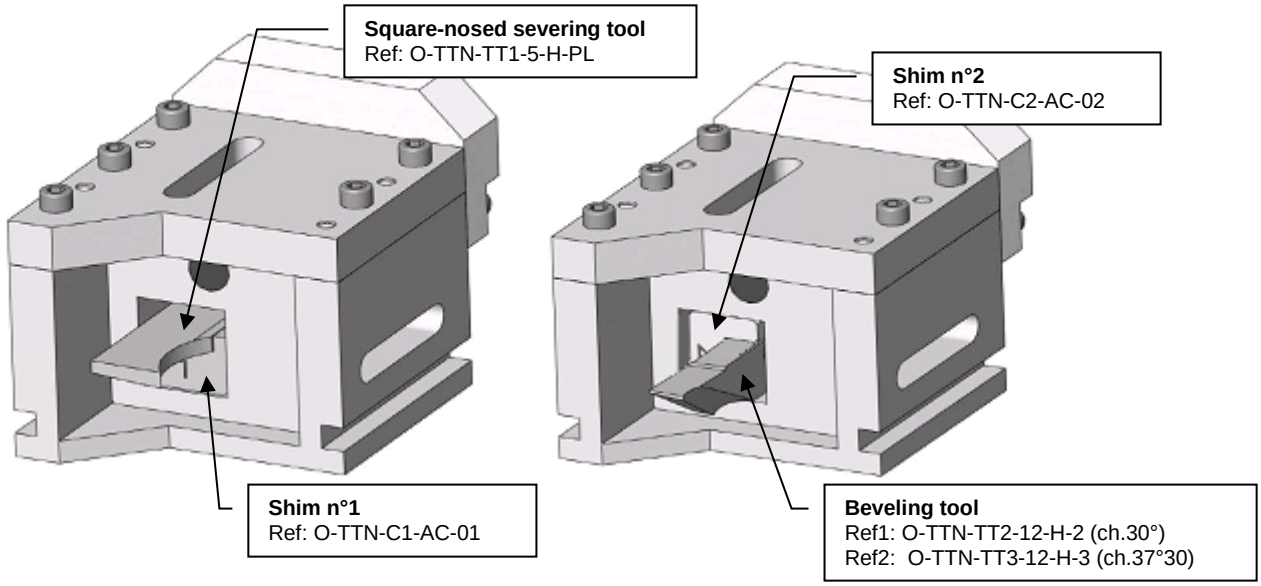
Cutting and beveling



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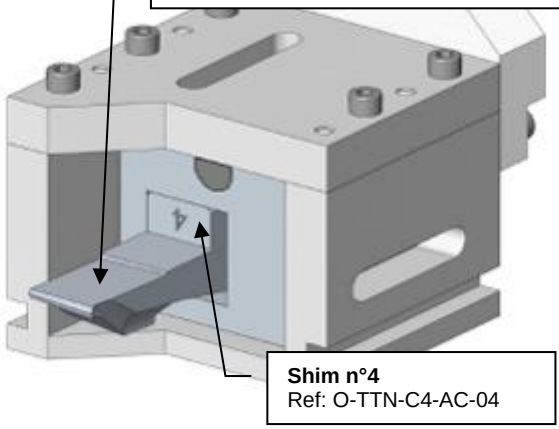
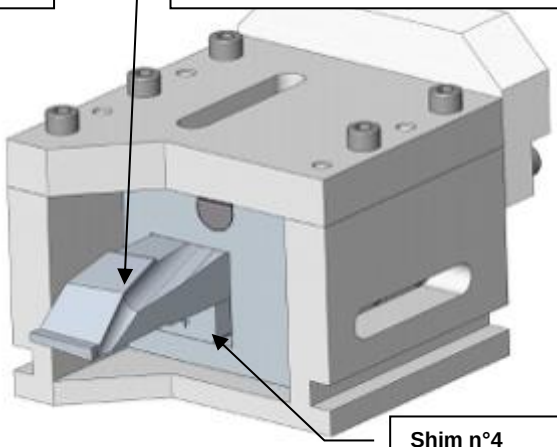
Double beveling

37°30-10° beveling tool
Ref: O-TTN-TT17-25-H-17



Shim n°4
Ref: O-TTN-C4-AC-04

37°30-10° reverse beveling tool
Ref: O-TTN-TT17I-25-H-1



Shim n°4
Ref: O-TTN-C4-AC-04

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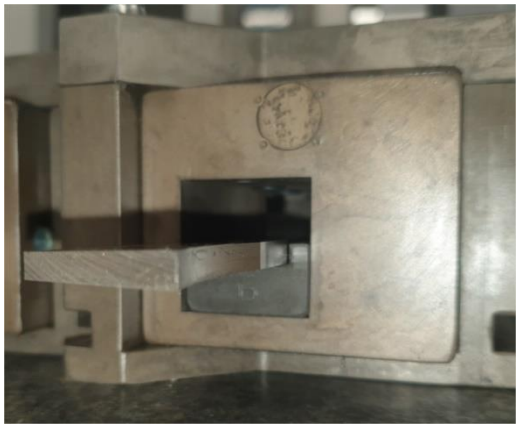
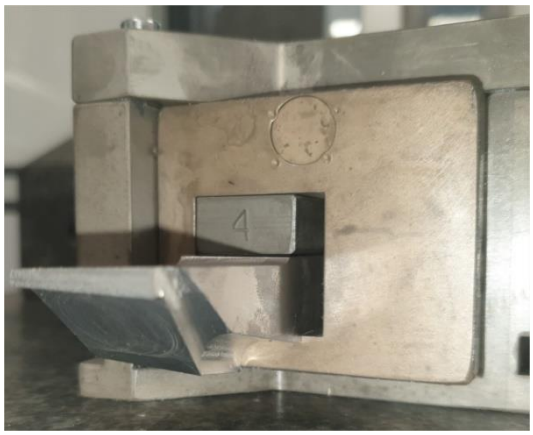
‘J’ angle beveling





Various other configurations are also possible. Please consult us for further details.

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A.3.4 SETTING FEED INCREMENTS

Principle:

The principle used for the tool-holder feed system is as follows:

① Tool plate rotation

The gear makes contact with the clutch finger

② Gear rotation

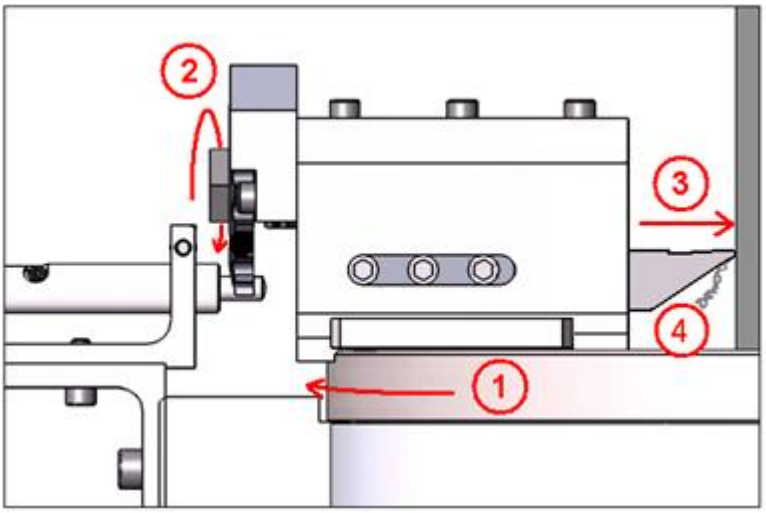
Carriage feed-screw rotation

③ Carriage feed

Tool feed

④ Penetration of the tool into the material

⑤ Cutting and beveling the pipe



Therefore, the setting for the clutch-release finger must be made as accurately as possible to have the best possible results when cutting.
NB: Depending on the finger's position, the carriage feeds in by either one or two teeth per revolution (see the following chapter).

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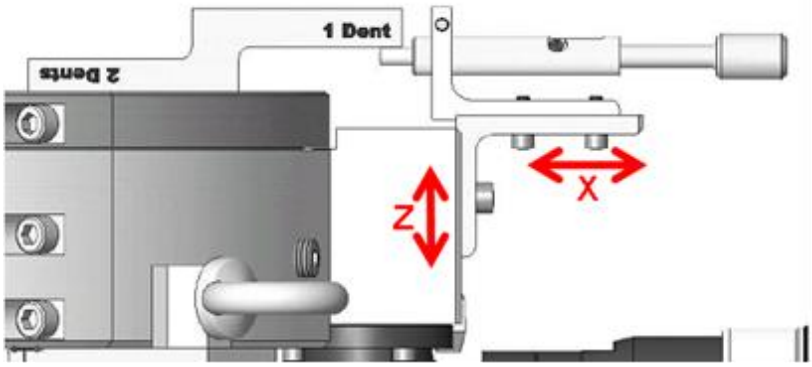
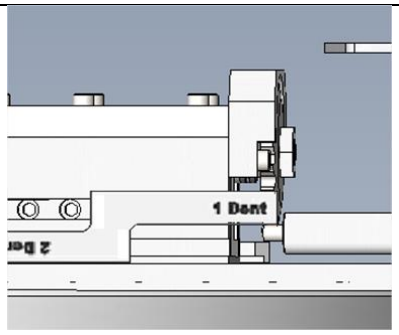
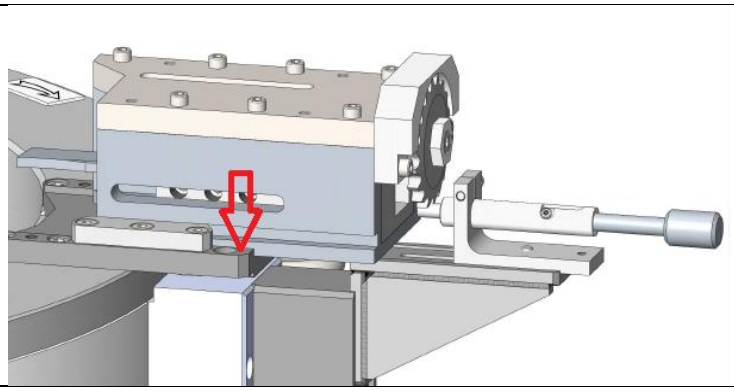
Setting the clutch finger:

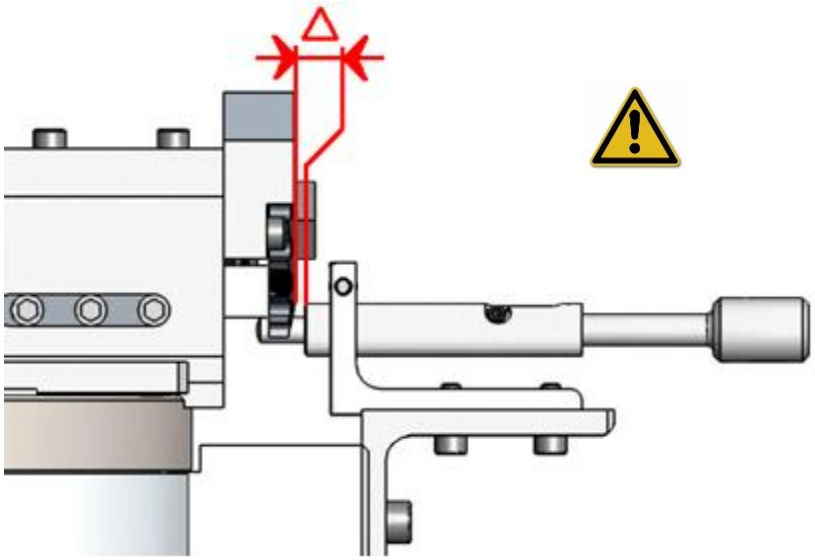
Use the shim supplied for setting the increment and proceed as follows:



Warning: If the machine has base plates under the tool holders (extension kit option), use the reference face shown below to position the 1-tooth/2-tooth shim.







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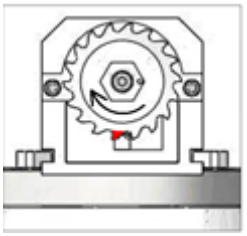
Warning:

1/ Move the clutch finger close to the carriage for adjusting depth X. Keep sufficient clearance Δ between the star wheel and the fixed part of the clutch finger.

2/ For setting height Z, check that the incremental movement of the gear wheel is correct in relation to the clutch finger (1 or 2 teeth).



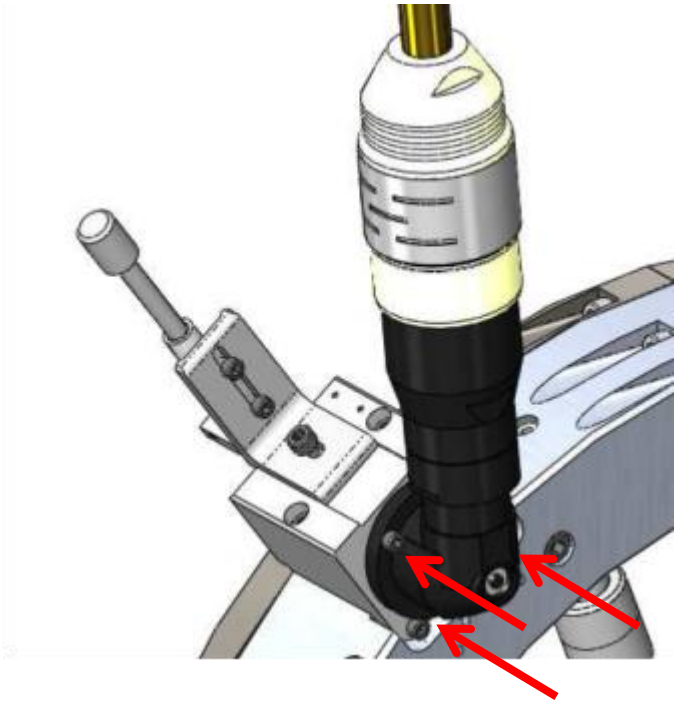
To do this:

- Mark one of the teeth (in red for example),
- Note the position of your mark,
- Start rotating the machine at low speed at either 9 or 18 RPM depending on the increment used.
- Stop turning,
- Check that the mark has returned to “0”
- If its position is not correct, re-adjust the clutch finger.

Note: For cutting the smallest pipes in the range, the clutch finger bracket can be turned over, which enables the tool carriage to get closer to the pipe.

A.3.5 INSTALLING THE MOTOR(S) ON THE MACHINE

Air motors: Install or re-install the motors on the machine. Use three screws per motor to hold them in position.



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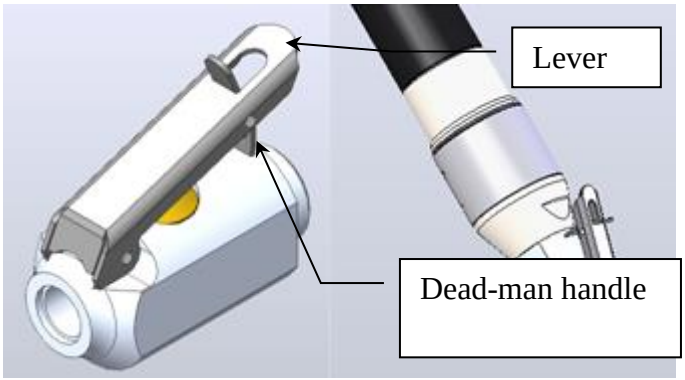
A.3.6 MACHINING

- Connect the machine to the power supply.
- Check that the following elements are mounted and held in position correctly:
  - Tools in the tool-holders,
  - The tool carriage on the tool plate,
  - The machine on the pipe.
- The tools will start rotating by using:
  - For an air motor, the “dead-man” handle fitted on the end of the manifold.

Reminder: The dead-man handle is a safety element. It prevents the operator from starting the spindle accidentally. To start the air-motor(s), unlock the safety trigger and press on the lever. This device may not be used for any other application nor be removed and replaced by a different device.	

- For a hydraulic motor: By pressing the start/stop button and by turning the knurled speed adjustment knob to find the right machining speed.

Direction reversing valve:	
	The direction reversing valve can be used for reversing the machine’s direction of rotation whenever necessary (for instance, should a tool break or jam in the material being machined). It must not be used for adjusting speeds under any circumstances whatsoever. Never leave the valve in an intermediate position. Always use the valve in one of its four positions: - Machining rotation position - 2x stop positions (0) - Reverse position (for retracting tools) **Important:** Always turn the valve to one of the “stop” positions (0) before stopping the hydraulic power pack to avoid any incident occurring when restarting the unit.

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A.3.7 CALCULATING PLATE ROTATION SPEED:

Warning: The tool plate rotation speed must be adjusted correctly.
The speeds given are theoretical and can vary depending on the type of tool, the machining configuration, bevel geometry, pipe thickness, material hardness, etc.

For optimal operation, recommended cutting speed (Cs) can vary between approximately **5 and 12 m per min.**

- Tool plate rotation speed (n) can be adjusted depending on the drive system used (See table below). To set the tool plate rotation speed (n) depending on the required cutting speed (Cs), the following formula must be applied:

n = CS (m/min) x 1000 : π.D(mm)

- Here is an example for machining a stainless steel pipe, with a dia. of 406.4 mm and a wall thickness of 25 mm using a TTNG 508 hydraulic drive:
- Circumference (mm) = 406 x 3.1416
- = 1276 mm.
- Recommended speed = 8 m per min = (8x1000): 1276
- = 6.27 RPM

- Set the calculated rotation speed:
  - For an air motor: by adjusting the required air flow (Warning: when the rotation speed is set under no-load conditions, it must be reset when the tools are under load).
  - For a hydraulic motor: By adjusting the speed using the potentiometer on the power pack (Refer to the user manual of the power pack used).

	AIR MOTOR(S)			
	Theoretical speed ranges for a machine equipped with air motor(s) at a pressure of 6 bars and a minimum air network capacity of 3600l per min.			
Model	Type of motor	Number of motors	The maximum motor speed at the shaft output under no-load conditions (rpm)	Maximum plate speed (rpm)
TTNG168	MO20	1	174	**23,0**
219	MO20	1	174	**20,0**
273	MO20	1	174	**17,0**
323	MO20	1	174	**15,0**
406	MO20	2	143	**10,0**
508	MO20	2	143	**9,0**
610	MO20	2	143	**7,5**
762	MO20	2	143	**6,5**
900	MO20	2	143	**5,0**

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1016	xxx		x	x

	HYDRAULIC MOTOR(S):									
	Speed ranges for machines fitted with hydraulic motors									
			HPP3KW		HPP 5,5KW		HPP 15KW		HPP 30KW	
Model	Number of motors	Motor capacity	Hydraulic power pack min/max flow (l/min)	Min/max plate speed with HPP3kw (rpm)	Maximum flow for hydraulic power pack (l/min)	Maximum plate speed with HPP 5.5 (rpm)	Maximum flow for hydraulic power pack (l/min)	Maximum plate speed with HPP 15kw (rpm)	Maximum flow for hydraulic power pack (l/min)	Maximum plate speed with HPP 15kw (rpm)
TTNG168	1	200	15 / 30	**10 / 20**	0 / 29	**0 / 20**	x	x	x	x
219	1	200	15 / 30	**8.75 / 17,5**	0 / 29	**0 / 17**	x	x	x	x
273	1	200	15 / 30	**7.5 / 15**	0 / 29	**0 / 14,5**	x	x	x	x
323	1	200	15 / 30	**6.75 / 13,5**	0 / 29	**0 / 13,0**	x	x	x	x
406	2	100	15 / 30	**5.75 / 11,5**	0 / 29	**0 / 11,0**	x	x	x	x
508	2	100	15 / 30	**4.75 / 9,5**	0 / 29	**0 / 9,5**	x	x	x	x
610	2	100	15 / 30	**4 / 8**	0 / 29	**0 / 8,0**	x	x	x	x
762	2	100	15 / 30	**3.25 / 6,5**	0 / 29	**0 / 6,5**	x	x	x	x
900	2	200	15 / 30	1.5 / 3	0 / 29	0 / 2,5	6 / 69	**0,5 / 6,5**	6 / 80	**0,5 / 7,5**
1016	2	200	x	x	x	x	6 / 69	**0,5 / 6,0**	6 / 80	**0,5 / 7**

Warning; Do the first turn at very low speed to avoid breaking tools should the unit not have been tightened into position concentrically or if the pipe is out-of-round.
To begin machining in total safety, it is recommended:

- Either to locate the maximum diameter of the pipe by marking it.
- Or to leave a gap of 5mm between the end of the pointed tool and the outside wall of the pipe.

- Setting the position of the tools in relation to the pipe:
  - Firstly, bring the pointed tool into position against the pipe until it starts cutting the groove.
  - Secondly, bring the square-nosed cutting tool into position against the pipe until it starts cutting the throat on the existing groove.
  - Stop turning.
  - Using a flat 24 mm spanner, move the gear wheel (clockwise) on the square-nosed tool carriage backward by about 4 teeth or 0.3 mm (this value may vary depending on machining specifications).

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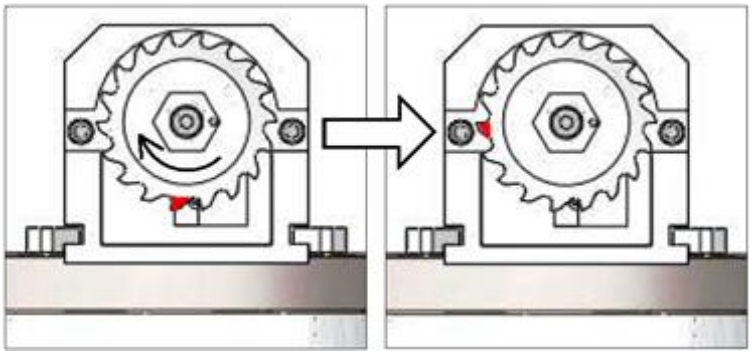
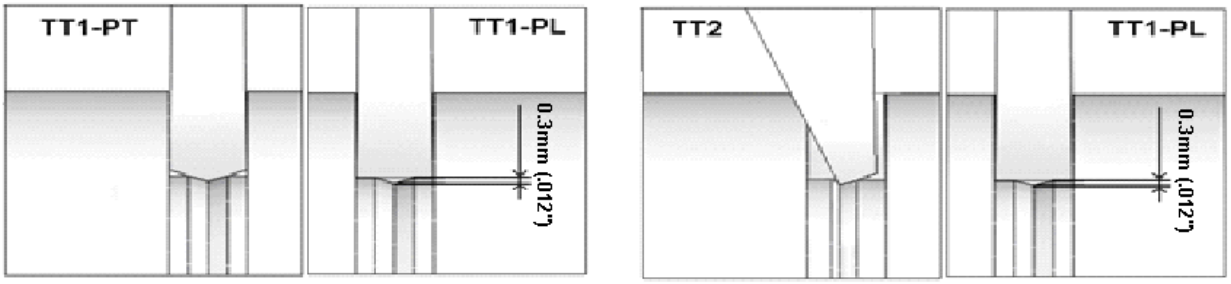
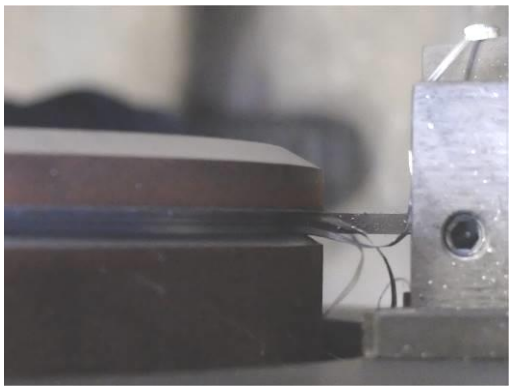
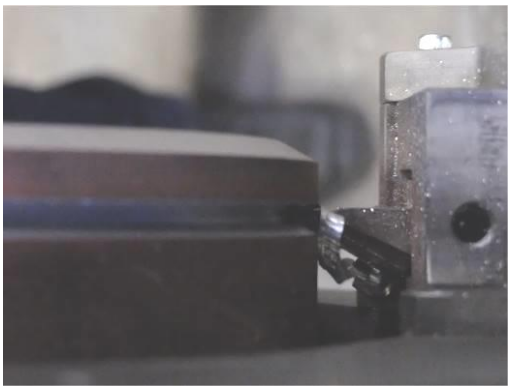


- You will then obtain the following machining configuration.



- Restart machining, checking that the carriages feed forward at a constant speed.





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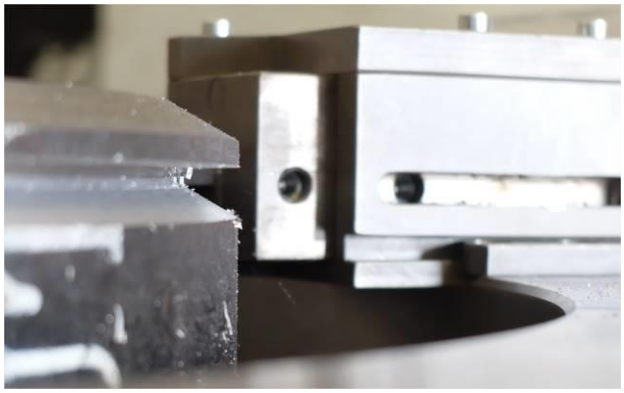
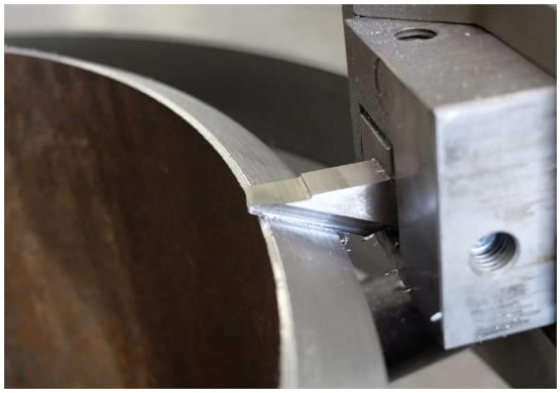
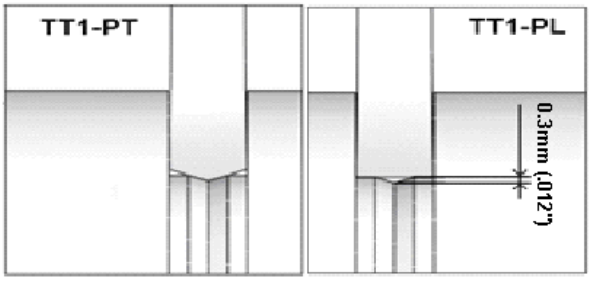


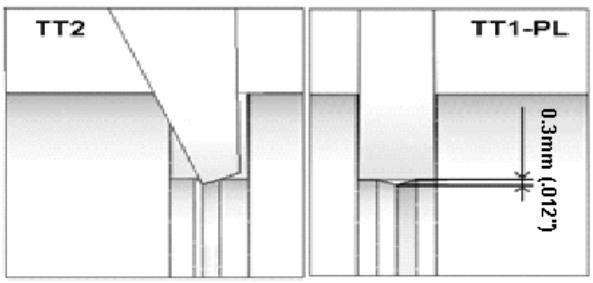


Warning: If you wish to remove chips whilst cutting, you MUST stop the machine from turning and use gloves with an extremely thick inside protection. Wearing gloves does not mean that the operator can remove chips by hand. This operation must be carried out using a suitable claw or a chip hook. Removing chips with your hands is strictly prohibited.

Procedure for stopping and restarting the unit during a machining cycle:

- Locate the pointed tool beforehand.
- Disengage the clutch finger just before the pointed tool passes in front of it and then let the machine turn for about 3 to 4 revs of the tool plate (until the tools produce no more or only very few chips).
- Stop the machine.
- Remove the chips as described above.
- Restart turning.
- **Warning:** To avoid changing the setting for the tool penetration depth, engage the clutch finger, taking care to start the pointed tool feed first.





NB: If the machine appears to be laboring when cutting, disengage the clutch and re-engage it when rotation has returned to normal.
If this anomaly persists, check the tools' cutting edges.

- We recommend lubricating when cutting, or cooling the tool with cutting oil, water, or compressed air.
- Once the cut has been finished, disengage the clutch finger and let the machine rotate for about three full turns, and then stop the machine.

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A.3.8 DISMANTLING THE MACHINE

- Put the tool-holder carriages in the retracted position and remove any chips.
- Put the fixed and rotating parts in the same plane and reinsert the 2 screws with red heads.
- Undo the half-ring closing screws.
- Open up the machine and clean (please refer to the corresponding chapter).

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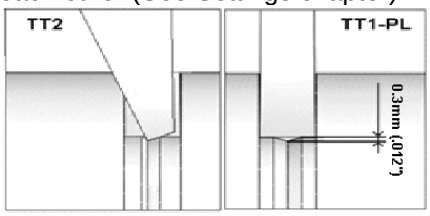
A.4 Problems encountered when machining, causes & solutions

⚠	Reminder: The checks indicated below are to be carried out when the machine is at a standstill with all the power supplies switched off or disconnected.

Incidents	Possible causes	Recommended solutions
Tool breakage	Poor feed incrementation / the 2 tools have moved out of position in relation to each other. To check whether the adjustment problem is the cause of the breakage. Check the setting of the tools in relation to each other (See Settings chapter)  And check whether the last chips made with the tool are not too thick (about 0.2mm at the most). 	Replace the tools, inspect the inside of the machined groove and remove any chips that may be caught in the slot. Check the position of the clutch finger and re-check that the gear wheels on the two carriages increment constantly (See Settings chapter)
	The feed speed on the tools is too high	Replace the tools, inspect the inside of the machined groove and remove any chips that may be stuck. Also, remove any broken tools caught in the groove, lower the rotation speed and/or feed speed of the carriages (**1 tooth**)
	Tool plate rotation speed is too high.	
	The material being machined is too hard.	Replace the tools, inspect the inside of the machined groove and remove any chips that may be caught. Also, remove any broken tools caught in the groove, **lower the rotation speed** and/or feed speed of the carriages (**1 tooth**)
		Tool characteristics not appropriate for the material in which the pipe has been made: consult the PROTEM sales department.
	The tool-holder carriages are damaged.	Check the condition of the cutting carriages (See Maintenance chapter)

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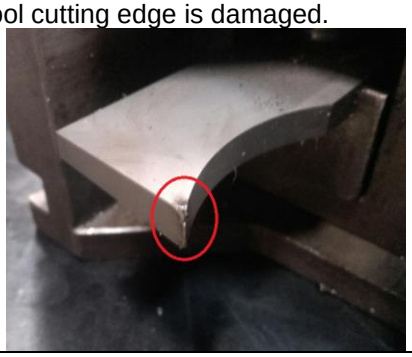
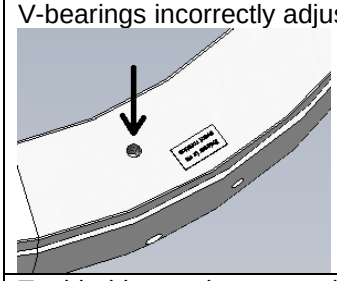
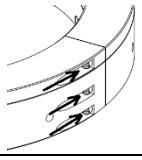
Incidents	Possible causes	Recommended solutions
Premature tool wear	Unsuitable cutting parameter(s)	Replace the tools and adjust the cutting parameters (rotation speed, carriage feed speed, lubrication if permitted)
Vibrations when machining (1*)	A tool cutting edge is damaged. 	Replace the tools and adjust the cutting parameters (rotation speed, carriage feed speed, lubrication if permitted)
	V-bearings incorrectly adjusted. 	Check the rotation of the V-bearings, if necessary adjust them strictly following the procedure indicated in the Maintenance chapter (reminder: **adjustment of the V bearings to be carried out on the machine without any constraints (<u>not clamped onto the pipe</u>), and placed horizontally on a stable assembly table)**
	Tool-holder carriages are damaged.	Check the condition of the cutting carriages (See Maintenance chapter)
	Clamping jaws and/or stabilizer screws are incorrectly clamped.	Using a torque wrench, check that the jaws and screws are tightened to **3daNm**.
	The locking screws on the two halves of the machine body are incorrectly locked in position. 	Check that the six crown-wheel clamping screws are tight. If the screws are tightened insufficiently, open the machine into 2 halves, check the state of the mating surfaces and the state of the locking screws (see **Maintenance chapter**)
	Tools and tool-holders are insufficiently tightened.	Check that the following elements are firmly tightened: - The tools in the tool-holders - The tool carriages on the tool plate. (**See Settings chapter**)
(*1) Vibrations may occur at the end of the machining process due to the thin layer of material remaining to be machined on the cut part of the pipe.		

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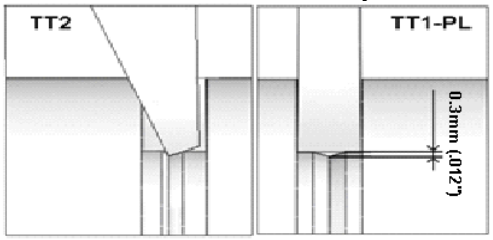
Incidents	Possible causes	Recommended solutions
Tools jamming in the material.	Pneumatic drive: lack of power	Pneumatic drive: check the conformity of the network: the cleanliness of the network and the lubricating filter, the absence of any foreign bodies in the network, check the service pressure (6 bars) and the flow available (3600l/min).
	Hydraulic drive: lack of power	Hydraulic drive: if the machine is fitted with a reversing valve, check the position of the control knob.
		Check that the hydraulic hoses are in good condition, that there are no leaks, and that the filter clogging indicator on the hydraulic unit is not “on” (see the manual of the hydraulic unit in use).
		The capacity (power) of the hydraulic pack is inadequate (consult PROTEM's sales department)<
	Poor feed incrementation / the 2 tools have moved out of position in relation to each other and have caused a jam.  	Check the position of the clutch finger and re-check that the two star wheels on the two carriages increment forward at a constant speed.

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A.5 Operating incidents on the drive-system

AIR MOTOR:

If MO20 motors do not rotate when connected to the compressed air supply:

- Check that the machine is connected to the energy supply,
- Remove the dead-man handle, make the rotor turn using a 5 mm Allen key on the roundhead screw (check that nothing can prevent the tool-holder from turning).

If the motor still does not rotate correctly, check the supply flow and the pressure of your air circuit:

- 1800 L per min for an MO20,
- Pressure: 6 bars.
- Check the diameter of the compressed air supply piping: 3/4'' or 1''.

HYDRAULIC MOTOR:

- Consult the hydraulic power-pack manual supplied.

If any problem persists, please contact us.

ELECTRIC MOTOR:

- Check that the voltage is correct: 110V – 240V – 380V.
- Check the connections and the power supply cable.

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A.6 Information on the filter lubricator

The oil level in the filter lubricator must be checked regularly. Before filling with oil, the air supply to the filter must be cut off and the unit must be depressurized.

Recommended oil:

- **PROTEM:** Oil for filter lubricator (Ref. F-Lub-0,5-L)
- **TOTAL:** AZOLLA ZS-22
- **ESSO:** ESSTIC 42
- **SHELL:** TELLUS 27
- **BP:** ENERGOL HL 85

The quantity of oil is adjusted using the drip-feed unit. We recommend using 4 to 6 drops per minute.

The water separator must be regularly checked and emptied using the draining system.

Only soap and water are to be used for cleaning oil and water reservoirs. After cleaning, they must be dried with compressed air. Solvents or abrasive cleaning products must not be used, as they may lead to bowls being irreparably damaged.

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A.7 Maintenance

AFTER-SALES SERVICE AND REPAIRS:

Even when used normally, this equipment is liable to require certain spare or wear parts to be repaired or replaced.
To ensure the correct operation of your machine, every 50 hours of use, please entrust your maintenance operations exclusively to a PROTEM facility or to a PROTEM certified company.

For all repairs and maintenance operations, only use constructor-approved and supplied spare parts.

NB: The information, specifications, and recommendations contained in this manual are liable to be modified without prior notice. Therefore, we invite you to contact our services at least once a year for receiving any manuals that may have been updated or modified.

Recommended grease:
- ORAPI CT4 608 MOS2 or equivalent

The machine and its accessories must always be stored and transported in the original crate supplied by PROTEM.

The use of inserts with non-compliant or unsuitable cutting edges, or inserts that have not been provided by PROTEM, may not only significantly reduce the machine's performances but also damage the machine and thereby annul the PROTEM manufacturer's warranty.

The machine's service life will be significantly shortened if any chips and/or other foreign objects have been allowed to enter the machine when running and insufficient care has been taken for removing them (use a brush).

General recommendations

We remind you that correct utilization and maintenance increase the machine's life. That is why we strongly recommend that operators using a TTNG machine be trained in operating these machines.

Therefore, it is vital that all OPERATING and MAINTENANCE instructions are strictly applied.

WARNING: Always disconnect the power or compressed air supply before doing any work on the machine.

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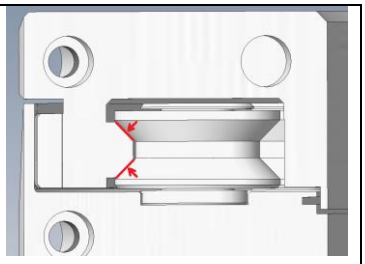
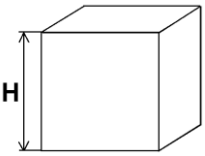
A.7.1 PREVENTIVE MAINTENANCE: PROCEDURE FOR CHECKING V-BEARING SETTINGS

General : The rotation of the machine's tool plate (rotating part) is ensured by several V-bearings. To guarantee the optimal operation of your machine, it is necessary to control the conformity of the **contact** of the bearings on the V track of the tool-holder plate. The frequency of this check is to be determined according to: - the frequency of use of the machine (intensive or occasional) - the conditions of use (e.g.: fine chips, lubrication, etc...) - the working environment (e.g.: air-conditioned workshop, outside, corrosive environment, etc...) **As an indication, for normal use, we recommend realizing this control every 20 to 30 hours of operation.**	

Equipment required:	
An 8mm Allen key	
A 5mm Allen key	
A lamp	
4 identical calibration blocks (H=100mm min. / 150mm max.)	

Protective equipment:	

Extra information
Recommendation: This job should be carried out by two operators for making it easier to make the right settings, especially on larger models beginning with the TTNG 610.
Important: Maintenance of the machine must be carried out without any constraints (not clamped onto the pipe) and placed in a horizontal position on an assembly table.

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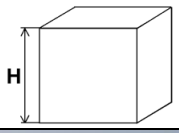
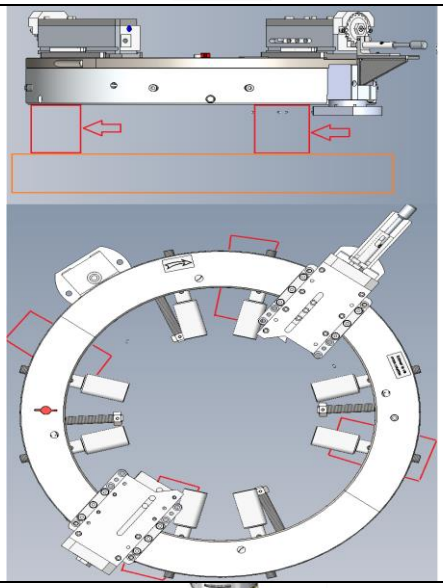
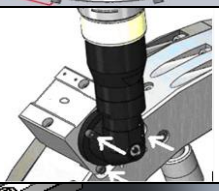
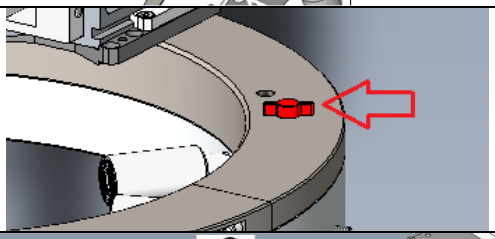
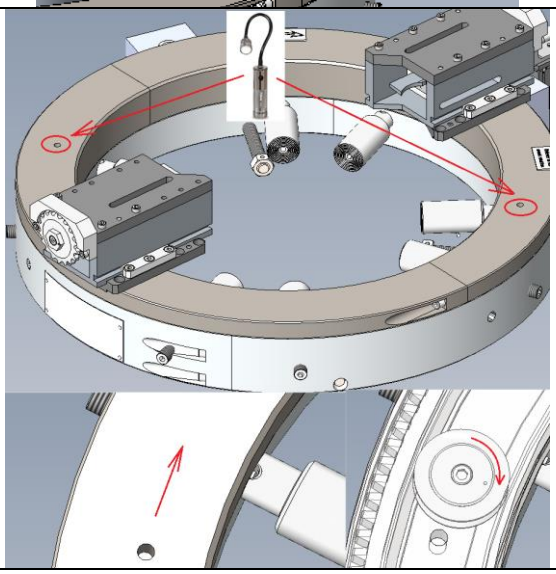
Place 4 blocks of the same height (H=100 to 150mm) flat on a stable, horizontal assembly table suitable for the weight of the machine.	
Place the machine on the 4 identical blocks (H=100 to 150mm).	
Dismantle the motor(s).	
Remove the 2 locking screws (red screws) to be able to see the V bearings through the openings.	
Place the lamp on the tool plate then rotate the tool plate to see the way the V bearings rotate by looking through the 2 openings opposite each other.	
If a V bearing does not turn, stop the unit and adjust the V bearing as described below:	

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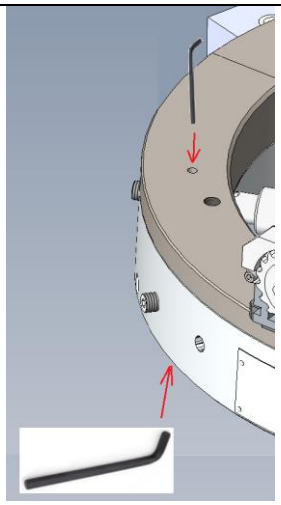
Pass the 5mm Allen key through the tool holder plate of the machine.

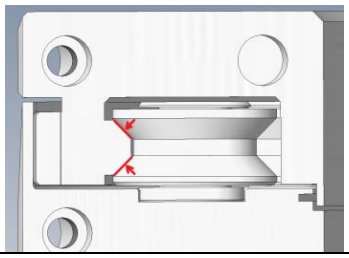
Loosen the V bearing with the 8mm Allen key.

With the 5mm Allen key, turn the V bearing counterclockwise to release the contact and **then clockwise to put it in contact with the V track.**

Hold the V bearing in position with the 5 mm Allen key and then tighten it with the 8 mm key.

Make the tool plate turn for checking that the V bearing you have just adjusted also turns correctly.
(Repeat the operation if necessary).





<u>Warning 5mm Allen key: the support torque of the V bearing on the track must be about 1.5N.m. If necessary, use a torque screwdriver to check.</u>

<u>Warning: The use of a machine whose bearings are badly adjusted can not only lead to important malfunctions during machining but also cause irreversible damage to the TTNG.</u>

Continue the checking operation on a full revolution of the machine. During the adjustment, be sure to observe the concentricity of the tool holder plate with respect to the body.

<u>IMPORTANT:</u>
Always comply with this method of setting to avoid any risk of premature wear on the unit. Inadequate maintenance or incorrect adjustment of the V bearings can lead to irreversible damage to the TTNG.

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A.7.2 PREVENTIVE MAINTENANCE: CUTTING CARRIAGE CHECKING PROCEDURE

Equipment required:	
A set of Allen keys, of 4, 5, 6, and 8mm.	
A ratchet wrench with a 24mm socket	
A brush and clean rags	
A jar of MoS2 grease	

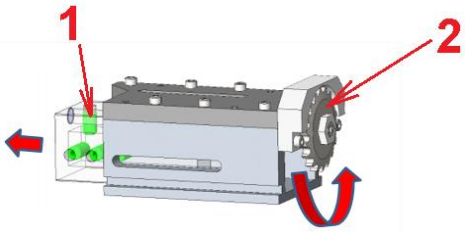
Protective equipment:	

PREVENTIVE CLEANING OF THE CUTTING CARRIAGES

General: To guarantee optimal operation during machining, and to ensure the longevity of the cutting carriages, it is necessary to clean them regularly. The periodicity of this cleaning is to be determined according to:

- the frequency of use of the machine (intensive or occasional)
- the conditions of use (e.g.: fine chips, lubrication, etc...)
- the working environment (e.g.: air-conditioned workshop, outside, corrosive environment, etc...)

As an indication, for normal use, we recommend realizing this cleaning every 5 to 10 hours of operation.

Check the condition of the wheel teeth (mark 2) Tighten the tool locking screws (item 1) to prevent them from interfering with the slide traverse. Turn the gear wheel with a ratchet wrench (24mm socket) to remove the entire slide from the carriage. Clean the entire inside of the carriage thoroughly with clean rags and a brush and remove any dirt (chips).	

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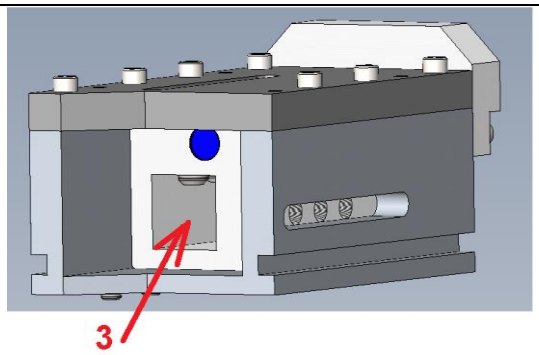
Check the condition of the tool housing (no signs of impacts or deformations) (item 3 opposite)	
Grease the slide and the feed-screw and re-assemble them in the carriage.	

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A.7.3 PREVENTIVE MAINTENANCE: PROCEDURE FOR CLEANING THE V BEARINGS, THE V TRACK, AND THE GEARING

General: To guarantee optimal operation during machining, and to ensure the longevity of the machine, it is necessary to clean it regularly.
The periodicity of this cleaning is to be determined according to:

- the frequency of use of the machine (intensive or occasional)
- the conditions of use (e.g.: fine chips, lubrication, etc...)
- the working environment (e.g.: air-conditioned workshop, outside, corrosive environment, etc...)

As an indication, for normal use, we recommend realizing this cleaning every 50 hours of operation

Equipment required:	
Set of hexagonal keys of 3, 4, 5, 6, 8mm	
A brush and clean rags	
A jar of MoS2 grease 1 Aluminum-based anti-seize spray.	

Protective equipment:	

Extra information

Have hoisting apparatus and accessories on hand. Ensure that they are compliant and suit the operations to be carried out and are suitable for them.

Recommendation:
This job should be carried out by two operators for making it easier to make the appropriate settings, especially on larger models beginning with the TTNG 610.

Important: Maintenance of the machine must be carried out without any constraints (not clamped onto the pipe) and in a horizontal position on an assembly table.

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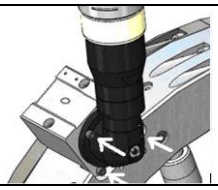
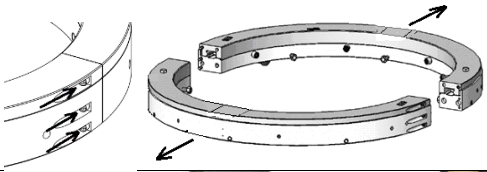
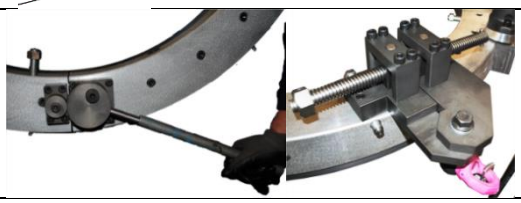
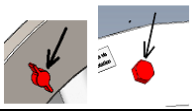
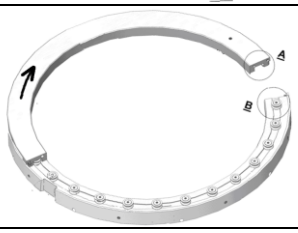
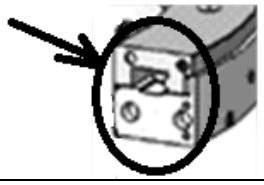
Place the machine flat on a solid horizontal assembly table suited to the weight of the machine.	
Dismantle the motor(s).	
Undo the locking screws on the two crown-wheels and then open the machine into two halves.	
NB: For models possessing an opening eccentric and an opening hinge, use these devices for making it easier to separate the machine's mating surfaces (See Options chapter)	
Remove the two locking screws (red screws).	
Rotate the two steel halves for taking them out.	
Using clean rags and a brush, thoroughly clean the whole internal part of the machine: remove any excess grease, clean the V bearings, and remove any dirt (chips).	
Check the rotation of the V bearings manually. Check that they all rotate freely without any snagging or hard spots. Replace any damaged V bearings if necessary.	
Check the condition of the mating surfaces (no chips, no impacts), and the condition of the centering rings and the locking screws.	

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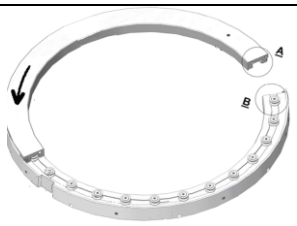
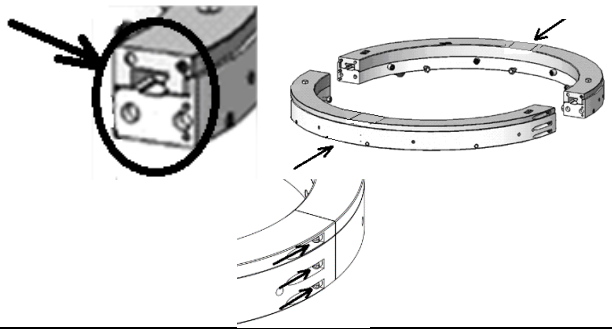
Grease the V bearing track, the V bearings, and the teeth correctly. Before applying the grease, to ensure the adhesion of the grease, it is recommended to apply aluminum-based paste such as UNIL OPAL ALUMIX or equivalent. Then apply ORAPI CT4 608 MOS2 grease or equivalent	
Assemble the new tool plate.	
Re-check the mating surfaces for dirt (chips), assemble the two halves, and then clamp them in place.	
Check the adjustment of the V-bearings by following the adjustment procedure explained in the paragraph "PREVENTIVE MAINTENANCE: Procedure for checking the adjustment of the V-bearings".	

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A.7.4 AIR MOTOR

- Check the equipment used for handling the compressed air supply.
- Check that the supply pressure is correct, with a minimum pressure of 6 bars. Otherwise, adjust it with the pressure regulator and make sure that the flow provides 1800 L per min. per motor.
- Check the oil level in the lubricator. Top up with special “Pneumatic tooling" oil if necessary.

NB: For the best possible lubrication, make sure that the filter is placed less than 5 meters away from the machine.
If the machine is to remain unused for 24 hours or more after being run on ‘wet’ air, it is advisable to squirt a few drops of oil directly into the air motor inlet and let the motor run for a few seconds. This will prevent any damage to the rotor vanes.

IMPORTANT: Our warranty will only apply if PROTEM filter-lubricators are used.
The warranty for the motor is null and void if any damage occurs because of exposure to unclean air or insufficient lubrication.

A.7.5 ELECTRIC MOTOR

- Check the voltage: 110V – 240V – 380V.
- Check the connections and the power supply cable.

A.7.6 HYDRAULIC MOTOR

- Take care not to crush hydraulic cables. If ever this happens, replace them immediately.
- Always check the oil level in the circuit.
- Keep connections clean.
- Consult the hydraulic power-pack manual for any maintenance operations that may be needed.

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A.7.7 MOTOR DRIVES

The planetary gear unit and the angle transmission are greased in our works with:

ORAPI - CTDMEP2 / 606
3606 S1
High-pressure grease
Color: blue

Note: The inside of the reduction gear is greased as standard and does not require any additional grease over time. However, during preventive maintenance operations, it is recommended to replace the used grease. Reminder: you must entrust your maintenance operations exclusively to a PROTEM facility or to a PROTEM certified company. If a motor component is damaged during disassembly by a non PROTEM-certified technician, the warranty will be void.
Lubricating instructions:
Reduction gear: Remove the used grease and apply the new grease, taking care to distribute it evenly inside the reduction gear (grease volume: 50-70ml).
Right-angle gear unit: If your motor is equipped with one, the right-angle gear unit must be lubricated every 200 hours of operation (grease nipple located on the top of the right-angle gear, volume 10-20ml).
It must be remembered that using too much grease causes motor temperatures to rise during machining operations.

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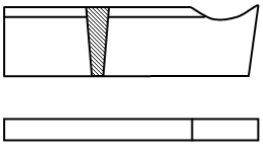
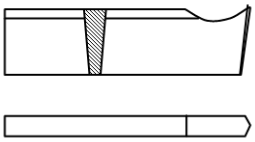
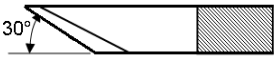
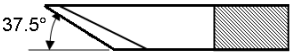
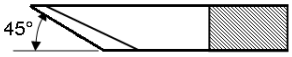
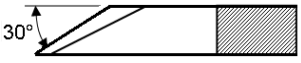
A.8 Standard tools

Order Number Order Number Bestellnummer	Description Désignation Beschreibung	Machine Machine Maschine	Max. Wall thickness Épaisseur Wandstärke	
O-TTN-TT1-5-H-PL	*Square nose cutting tool bit* *Outil de coupe pelle* *Nachschneider*	TTNG	35 mm 1.378"	
O-TTN-TT1-5-H-PT	*Pointed tool bit* *Outil de coupe pointe* *Vorschneider*	TTNG	35 mm 1.378"	
O-TTN-TT2-12-H-2	*30° beveling tool bit* *Outil de chanfrein 30°* *Anfasmesser 30°*	TTNG	25 mm 0.98"	
O-TTN-TT3-12-H-3	*37.5° beveling tool bit* *Outil de chanfrein 37.5°* *Anfasmesser 37.5°*	TTNG	19 mm 0.75"	
O-TTN-TT4-12-H-4	*45° beveling tool bit* *Outil de chanfrein 45°* *Anfasmesser 45°*	TTNG	14 mm 0.55"	
O-TTN-TT5-12-H-5	*30° reversed beveling tool bit* *Outil à chanfreiner inversé à 30°* *Anfasmesser 30°, invers*	TTNG	23 mm 0.905"	

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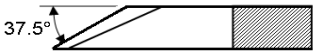
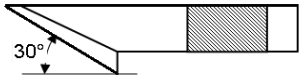
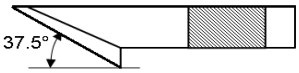
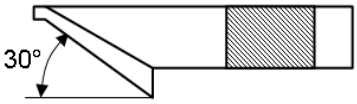
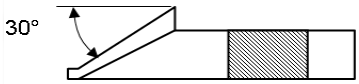
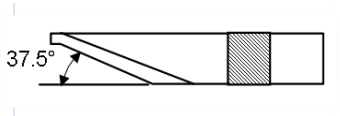
Order Number Order Number Bestellnummer	Description Désignation Beschreibung	Machine Machine Maschine	Max. Wall thickness Épaisseur Wandstärke	
O-TTN-TT6-12-H-6	*37.5° reversed beveling tool bit* *Outil à chanfreiner inversé à 37.5°* *Messer 37.5°, invers*	TTNG	20 mm 0.787"	
O-TTN-TT7-25-H-7	*30° beveling tool bit* *Outil de chanfrein 30°* *Anfasmesser 30°*	TTNG	32 mm 1.25"	
O-TTN-TT8-25-H-8	*37.5° beveling tool bit* *Outil de chanfrein 37.5°* *Anfasmesser 37.5°*	TTNG	36 mm 1.417"	
O-TTN-TT9-25-H-9	*30° beveling tool bit for double bevel* *Outil de chanfrein 30° pour double chanfrein* *Anfasmesser 30°, für Doppelfase*	TTNG	31 mm 1.22"	
O-TTN-TT9I-25-H-9	*30° reversed beveling tool bit for double bevel* *Outil de chanfrein 30° inversé pour double chanfrein* *Anfasmesser 30° , invers, für Doppelfase*	TTNG	34 mm 1.338"	
O-TTN-TT10-12-H-10	*37.5° beveling tool bit for double bevel* *Outil de chanfrein 37.5° pour double chanfrein* *Anfasmesser 37.5° für Doppelfase*	TTNG	15 mm 0.590"	
O-TTN-TT10I-12-H-10	*37.5° reversed beveling tool bit for double bevel* *Outil de chanfrein 37.5° inversé pour double chanfrein* *Messer 37.5° für Doppelfase, invers*	TTNG	15 mm 0.590"	

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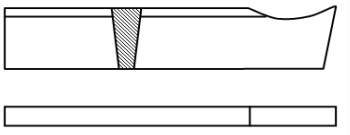
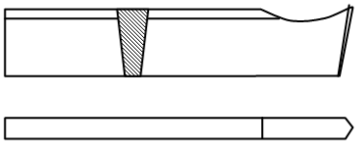
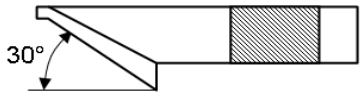
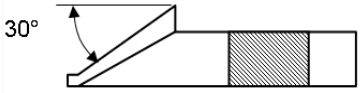
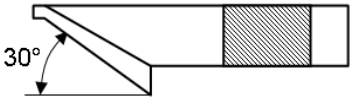
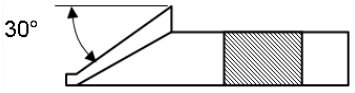
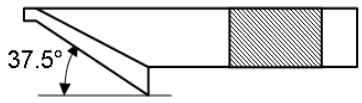
Order Number Order Number Bestellnummer	Description Désignation Beschreibung	Machine Machine Maschine	Max. Wall thickness Épaisseur Wandstärke	
O-TTN-TT11-5-H-PL	*Square-nose severing tool bit* *Outil de coupe pelle* *Nachschneider*	TTNG	90 mm 3.543"	
O-TTN-TT11-5-H-PT	*Pointed cutting tool bit* *Outil de coupe pointe* *Vorschneider*	TTNG	90 mm 3.543"	
O-TTN-TT12-25-H-12	*30° beveling tool bit for double bevel* *Outil de chanfrein 30° pour double chanfrein* *Anfasmesser 30° Doppelfase*	TTNG	42 mm 1.65"	
O-TTN-TT12I-25-H-12	*30° reversed beveling tool bit for double bevel* *Outil de chanfrein 30° inversé pour double chanfrein* *Anfasmesser 30°, Doppelfase, invers*	TTNG	44 mm 1.73"	
O-TTN-TT13-25-H-13	*30° beveling tool bit for double bevel* *Outil de chanfrein 30° pour double chanfrein* *Anfasmesser 30° für Doppelfase*	TTNG	32 mm 1.26"	
O-TTN-TT13I-25-H-13	*30° reversed beveling tool bit for double bevel* *Outil de chanfrein 30° inversé pour double chanfrein* *Anfasmesser 30° Doppelfase, invers*	TTNG	35 mm 1.377"	
O-TTN-TT14-25-H-14	*37.5° beveling tool bit* *Outil de chanfrein 37.5°* *Anfasmesser 37.5°*	TTNG	47 mm 1.85"	

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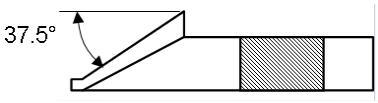
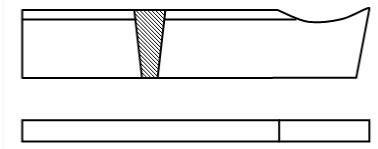
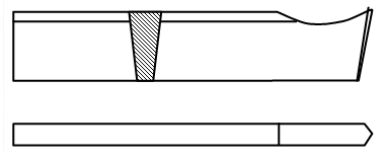
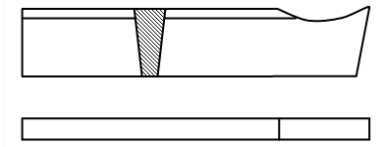
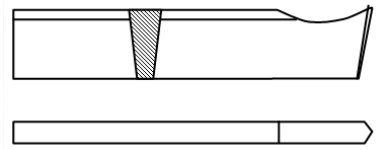
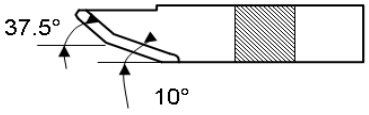
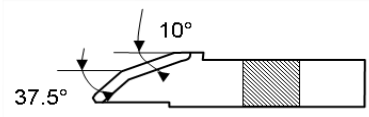
Order Number Order Number Bestellnummer	Description Désignation Beschreibung	Machine Machine Maschine	Max. Wall thickness Épaisseur Wandstärke	
O-TTN-TT14I-25-H-14	*37.5° reversed beveling tool bit for double bevel* *Outil de chanfrein 37.5° inversé pour double chanfrein* *Anfasmesser 37.5°, invers*	TTNG	49 mm 1.93 "	
O-TTN-TT15-8-H-PL	*Square-nose severing tool bit* *Outil de coupe pelle* *Nachschneider*	TTNG	90 mm 3.543"	
O-TTN-TT15-8-H-PT	*Pointed cutting tool bit* *Outil de coupe pointe* *Vorschneider*	TTNG	90 mm 3.543"	
O-TTN-TT16-8-H-PL	*Square-nose severing tool bit* *Outil de coupe pelle* *Nachschneider*	TTNG	90 mm 3.543"	
O-TTN-TT16-8-H-PT	*Pointed cutting tool bit* *Outil de coupe pointe* *Vorschneider*	TTNG	90 mm 3.543"	
O-TTN-TT17-25-H-17	*37.5° / 10° beveling tool bit for compound bevel* *Outil double pente 37.5° / 10°* *Anfasmesser 37,5°/10° Doppelfase*	TTNG	32 mm 1.26"	
O-TTN-TT17I-25-H-17	*37.5° / 10° reversed compound beveling tool bit for double bevel* *Outil double pente 37.5° / 10° inversé pour double chanfrein* *Messer 37,5°/10° Doppelfase, invers*	TTNG	34 mm 1.34"	

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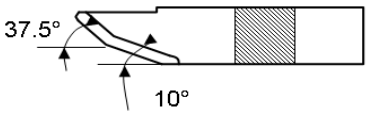
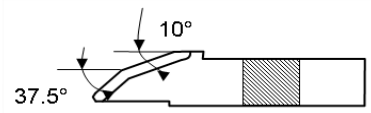
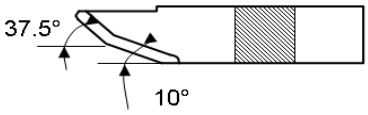
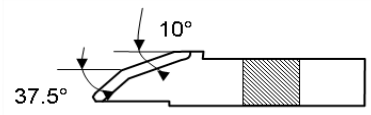
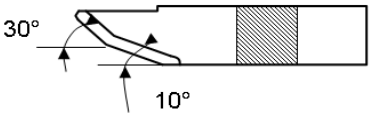
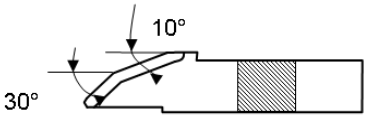
Order Number Order Number Bestellnummer	Description Désignation Beschreibung	Machine Machine Maschine	Max. Wall thickness Épaisseur Wandstärke	
O-TTN-TT18-25-H-18	*37.5° / 10° beveling tool bit for compound bevel* *Outil double pente 37.5° / 10°* *Anfasmesser 37,5°/10° Doppelfase*	TTNG	38 mm 1.49"	
O-TTN-TT18I-25-H-18	*37.5° / 10° reversed compound beveling tool bit for double bevel* *Outil double pente 37.5° / 10° inversé pour double chanfrein* *Messer 37,5°/10° Doppelfase, invers*	TTNG	40 mm 1.57"	
O-TTN-TT19-25-H-19	*37.5° / 10° beveling tool bit for compound bevel* *Outil double pente 37.5° / 10°* *Anfasmesser 37,5°/10° Doppelfase*	TTNG	50 mm 1.968''	
O-TTN-TT19I-25-H-19	*37.5° / 10° reversed compound beveling tool bit for double bevel* *Outil double pente 37.5° / 10° inversé pour double chanfrein* *Messer 37,5°/10° Doppelfase, invers*	TTNG	50 mm 1.968"	
O-TTN-TT20-25-H-20	*30° / 10° beveling tool bit for compound bevel* *Outil double pente 30 /10°* *Anfasmesser 30°/10° Doppelfase*	TTNG	36 mm 1.41"	
O-TTN-TT20I-25-H-20	*30° / 10° reversed compound beveling tool bit for double bevel* *Outil double pente 30° / 10° inversé pour double chanfrein* *Anfasmesser 30°/10° Doppelfase, invers*	TTNG	39 mm 1.53"	

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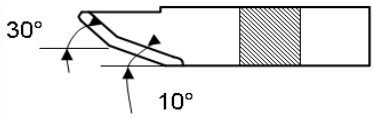
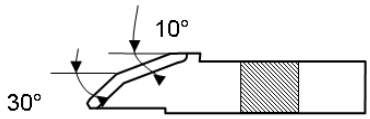
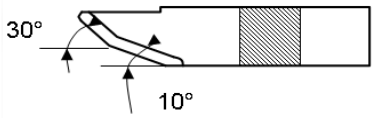
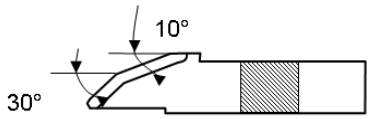
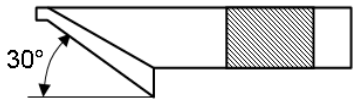
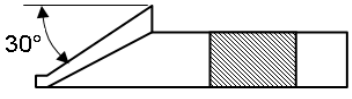
O-TTN-TT21-25-H-21	*30° / 10° beveling tool bit for compound bevel* *Outil double pente 30 /10°* *Anfasmesser 30°/10° Doppelfase*	TTNG	50 mm 1.968''	
O-TTN-TT21I-25-H-21	*30° / 10° reversed compound beveling tool bit for double bevel* *Outil double pente 30° / 10° inversé pour double chanfrein* *Messer 30°/10° Doppelfase, invers*	TTNG	50 mm 1.968''	
O-TTN-TT22-25-H-22	*30° / 10° beveling tool bit for compound bevel* *Outil double pente 30° / 10°* *Anfasmesser 30°/10° Doppefase*	TTNG	50 mm 1.968"	
O-TTN-TT22I-25-H-22	*30° / 10° reversed compound beveling tool bit for double bevel* *Outil double pente 30° / 10° inversé pour double chanfrein* *Anfasmesser 30°/10° Doppelfase, invers*	TTNG	50 mm 1.968"	
O-TTN-TT23-25-H-23	*30° beveling tool bit for double bevel* *Outil de chanfrein 30° pour double chanfrein* *Anfasmesser 30° Doppelfase*	TTNG	50 mm 1.968"	
O-TTN-TT23I-25-H-23	*30° reversed beveling tool bit for double bevel* *Outil de chanfrein 30° inversé pour double chanfrein* *Anfasmesser 30° lDoppelfase, invers*	TTNG	50 mm 1.968"	

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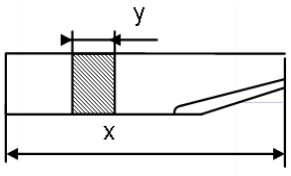
Order Number Order Number Bestellnummer	Description Désignation Beschreibung	Machine Machine Maschine	Max. Wall thickness Épaisseur Wandstärke	
Please consult us! ***Nous consulter!*** ***Wenden Sie sich an uns!***	*Counterboring tool bit (all design)* *Outil de délardage (toutes formes)* *Messer für die Innenbearbeitung*	TTNG		

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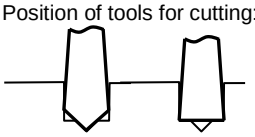
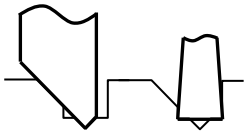
Position of tools for cutting:



Position of tools for cutting and beveling:



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ASSOCIATIONS OF TOOLS, SHIMS, AND REAL CAPACITIES OF BEVELING TOOLS

TOOL	SHIM (*4)	ANGLE	ASSOCIATED SLITTING TOOL	SHIM (*4)	ASSOCIATED BEVELING TOOL (*1)	SHIM (*4)	REAL MAX. CAPACITY (*2) mm (inch)	RECOMMENDED TOOL-HOLDER mm (inch)
TT2	C2	30° α1 (*3)	TT1-PL	C1	X	X	25,74 (1,01'')	C50mm (1,97'')
TT3	C2	37,5°	TT1-PL	C1	X	X	19,36 (0,76'')	C50mm (1,97'')
TT4	C2	45°	TT1-PL	C1	X	X	14,86(0,58'')	C50mm (1,97'')
TT5	C10	30° INV	TT1-PL	C11	X	X	23,63 (0,93'')	C50mm (1,97'')
TT6	C10	37,5° INV	TT1-PL	C11	X	X	21,69 (0,85'')	C50mm (1,97'')
TT7	X	30°	TT1-PL	C1	X	X	33,28 (1,31'')	C50mm (1,97'')
TT8	X	37,5°	TT1-PL	C9	X	X	37,05 (1,46'')	C50mm (1,97'')
TT9	X	30°	TT1-PL	C6	X	X	31,74 (1,25'')	C50mm (1,97'')
TT9'	C4	30° INV	X	X	TT9	C4	34,15 (1,34'')	C50mm (1,97'')
TT10	C5	37,5°	TT1-PL	C6	X	X	15,13 (0,59'')	C50mm (1,97'')
TT10'	C5	37,5° INV	X	X	TT10	C5	16,94 (0,67'')	C50mm (1,97'')
TT12	C4	30°	TT11-PL	C6	X	X	42,14 (1,66'')	C100mm (3,94'')
TT12'	C4	30° INV	X	X	TT12	C4	44,55 (1,79'')	C100mm (3,94'')
TT13	C4	30°	TT11-PL	C6	X	X	33,48 (1,32'')	C100mm (3,94'')
TT13'	C4	30° INV	X	X	TT13	C4	35,89 (1,41'')	C100mm (3,94'')
TT14	C4	37,5°	TT11-PL	C6	X	X	48,46 (1,91'')	C100mm (3,94'')
TT14'	C4	37,5° INV	X	X	TT14	C4	50,27 (1,98'')	C100mm (3,94'')
TT17	C4	37,5° α1 (*3)/ 10° α2 (*3)	TT11-PL	C6	X	X	33,03 (1,3'')	C100mm (3,94'')
TT17'	C4	37,5°/10° INV	X	X	TT17	C4	35,04 (1,38'')	C100mm (3,94'')
TT18	C4	37,5°/10°	TT11-PL	C6	X	X	38,82 (1,21'')	C100mm (3,94'')
TT18'	C4	37,5°/10° INV	X	X	TT18	C4	40,72 (1,6'')	C100mm (3,94'')
TT19	C4	37,5°/10°	TT11-PL	C6	X	X	53,77 (2,12'')	C100mm (3,94'')
TT19'	C4	37,5°/10° INV	X	X	TT19	C4	55,66 (2,19'')	C100mm (3,94'')
TT20	C4	30°/10°	TT11-PL	C6	X	X	37,54 (1,48'')	C50mm (1,97'')
TT20'	C4	30°/10° INV	X	X	TT20	C4	40,02 (1,58'')	C50mm (1,97'')
TT21	X	30°/10°	TT11-PL	C6	X	X	54,35 (2,14'')	C100mm (3,94'')
TT21'	C4	30°/10° INV	X	X	TT21	C4	56,83 (2,24'')	C100mm (3,94'')
TT22	C4	30°/10°	TT11-PL	C6	X	X	50,92 (2'')	C100mm (3,94'')
TT22'	C4	30°/10° INV	X	X	TT22	C4	59,08 (2,33'')	C100mm (3,94'')
TT23	C4	30°	TT11-PL	C6	X	X	50,8 (2'')	C100mm (3,94'')
TT23'	C4	30° INV	X	X	TT23	C4	53,21 (2,09'')	C100mm (3,94'')
TT24	C5	30°	TT1-PL	C6	X	X	20,11 (0,79'')	C50mm (1,97'')
TT24'	C5	30° INV	X	X	TT24	C5	22,52 (0,89'')	C50mm (1,97'')
TT25	C4	37,5°	TT1-PL	C6	X	X	36,73 (1,45'')	C50mm (1,97'')
TT25'	C4	37,5° INV	X	X	TT25	C4	38,54 (1,52'')	C50mm (1,97'')

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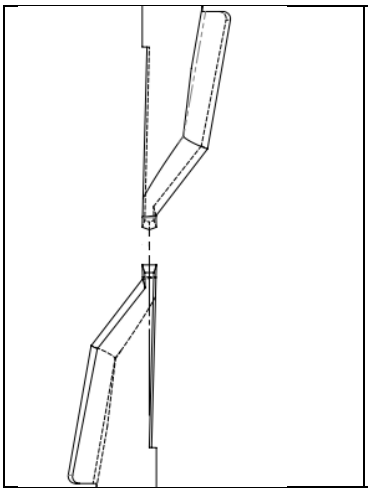
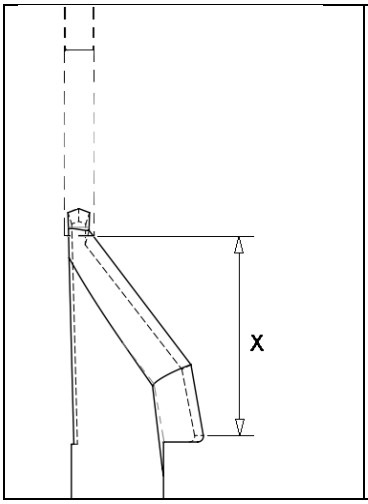
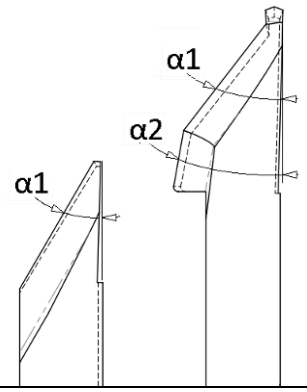


(1*) for a double bevel operation

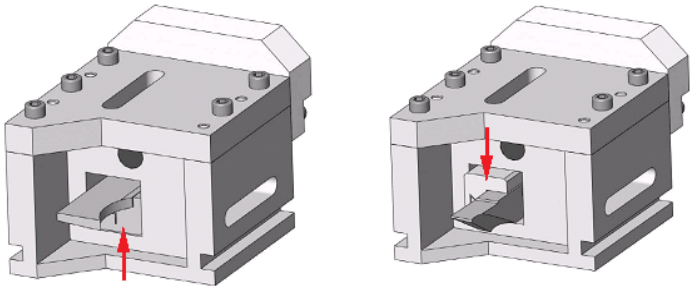


(2*) This dimension corresponds to the length X of the bevel made with the associated tool (see diagram opposite). Warning: the real maximum capacity of the tools is for information purposes only and does not correspond to the tools' machining capacity on the machine. The maximum machining capacity is lower than the tools' capacity and depends on several other factors such as the hardness of the pipe to be machined, motor torque, the geometric tolerance of the pipe, and its out-of-roundness.

(3*)



(4*)



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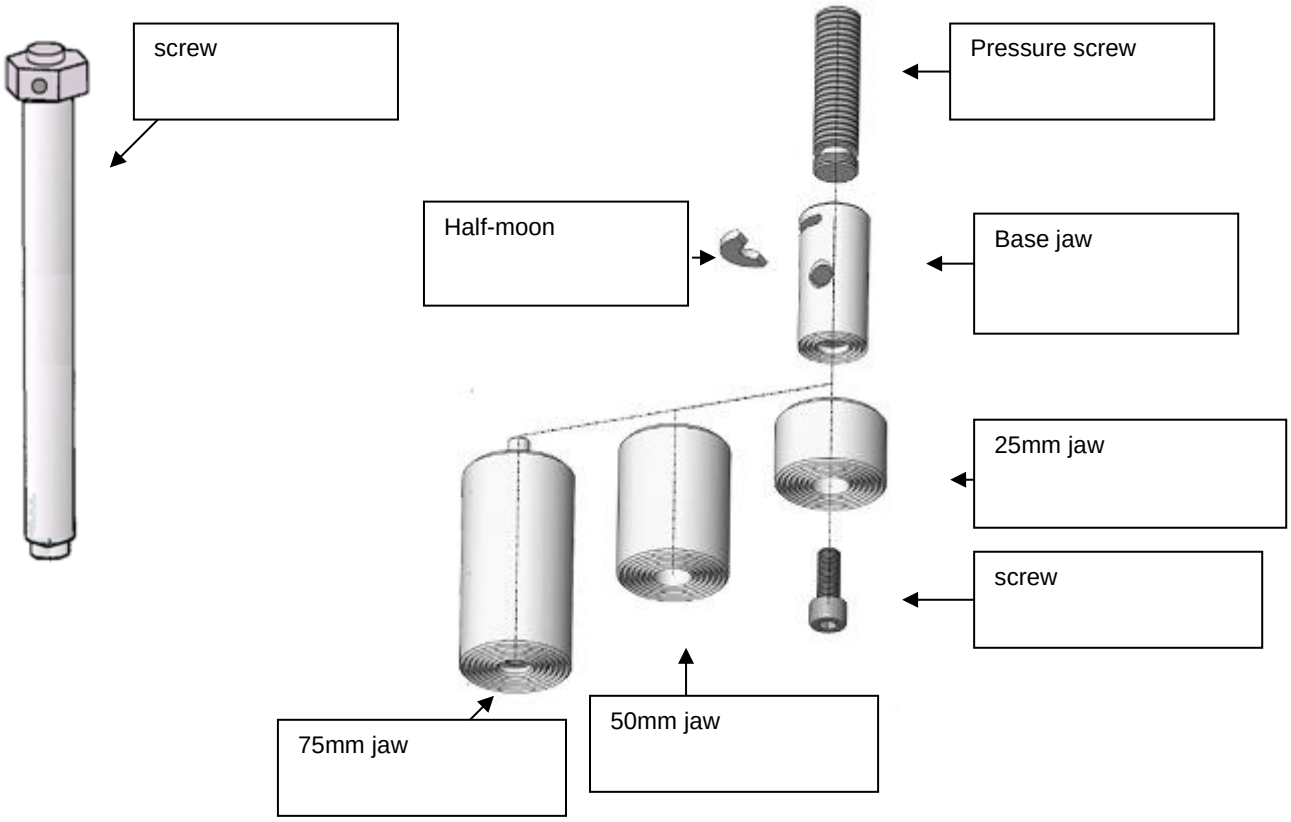
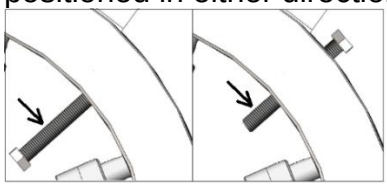
A.9 Laying up jaws



		Base jaw (BB)		BB + jaw H=25		BB + jaw H=50		BB + jaw H=75		BB + jaw H=75 + jaw H=25		BB + jaw H=75 + jaw H=50	
	ID / Machine (mm)	Ø max.	Ø min.	Ø max.	Ø min.	Ø max.	Ø min.	Ø max.	Ø min.	Ø max.	Ø min.	Ø max.	Ø min.
TTNG-168	175	173	119	121,2	69	71.2	56.5						
TTNG-219	223	221	167	170	117	120	67						
TTNG-273	283	281	227	230,7	177	180,7	127						
TTNG-323	331	329	275	279	225	229	175						
TTNG-406	415	413	359	363,4	309	313,4	259						
TTNG-508	517	515	461	465,7	411	415,7	361	365,7	311				
TTNG-610	619	617	563	567,9	513	517,9	463	467,9	413				
TTNG-762	775	773	719	724,1	669	674,1	619	624,1	569				
TTNG-900	926	924	870	875,3	820	825,3	770	775,3	720	724	670	674	660.4
TTNG-1016	1040	1038	984	989.3	934	939.3	884	889.3	834	840	812.8		

NB: Depending on the diameter of the pipe to be machined, the stabilizer screws can be positioned in either direction (see diagrams below).



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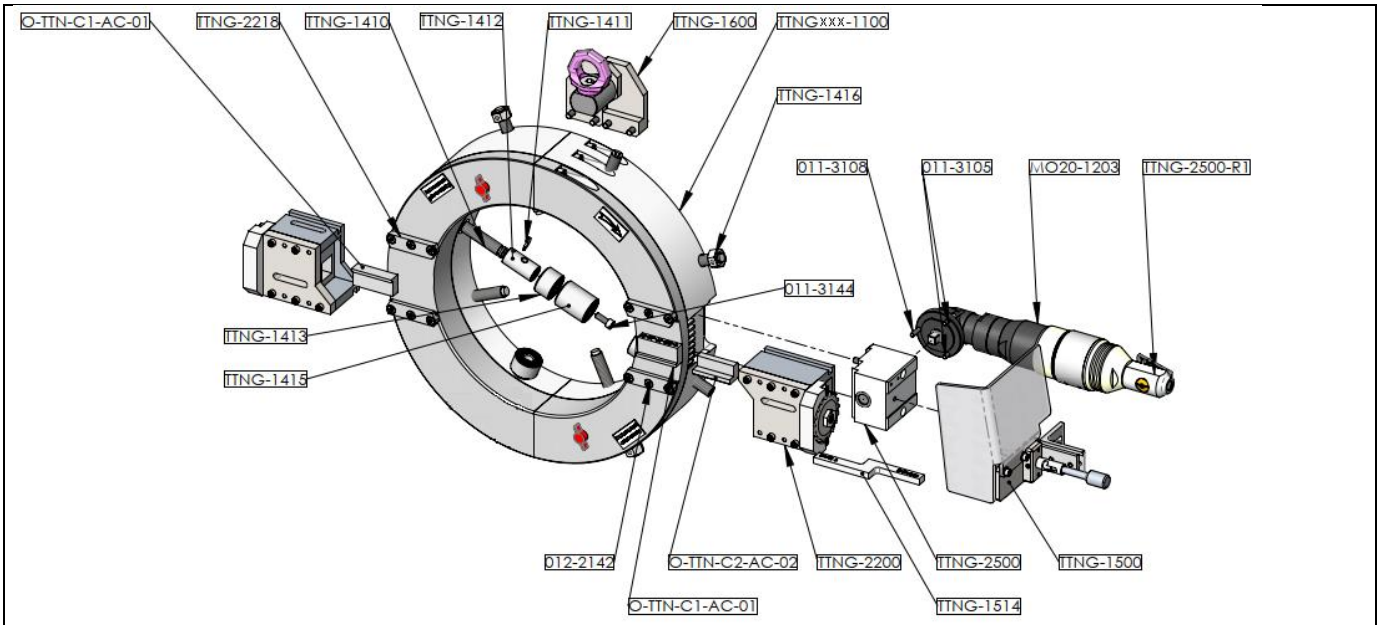
A.10 Machine *01/21*: Exploded views and parts lists

- **TTNG 168 à TTNG 323 air-motor**



TTNG-323-1000EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw	Schraube	2
011-3108	Vis	Screw	Schraube	1
011-3144	Vis	Screw	Schraube	4
012-2142	Vis	Screw	Schraube	12
MO20-1203	MO20-ROT-D-2ET-9/12-RA-CARREE	MO20-ROT-D-2ET-9/12-RA-SQUARE		1
O-TTN-C1-AC-01	CALE-N°1 pour TT1PL/TT1PT	SHIM-N°1 for TT1PL/TT1PT		2
O-TTN-C2-AC-02	CALE-N°2 pour TT2/TT3/TT4	SHIM-N°2 for TT2/TT3/TT4		1
TTNG-1410	VIS DE PRESSION	Pressure screw		4
TTNG-1411	DEMI-RONDELLE	Half-washer		4
TTNG-1412	MORS DE BASE	BASE JAW		4
TTNG-1413	PATIN SOUS MORS	Pad under		4
TTNG-1415	PATIN SOUS MORS	Pad under		4
TTNG-1416	VIS DE MORS	Jaw screw		4
TTNG-1500	SOUS-ENSEMBLE EMBRAYAGE TTNG-168 à 508	CLUTCH SUB-ASSEMBLY TTNG 168 TO TTNG 508		1
TTNG-1514	CALE DE REGLAGE EMBRAYAGE	CLUTCH ADJUSTMENT SHIM		1

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TTNG-1600	SOUS-ENSEMBLE CHARNIERE TTNG-168 à TT 508	HINGE SUB-ASSEMBLY TTNG-168 to TT 508		1
TTNG-2200	CHARIOT-COURSE 50	Carriage with 50mm traverse		2
TTNG-2218	BARRETTE DE FIXATION	HOLDING BAR		4
TTNG-2500	BOITIER MOTORISATION PNEUMATIQUE TTNG-168 à 610	AIR-MOTOR DRIVE BOX TTNG-168 to 610		1
TTNG-2500-R1	RACCORDEMENT 1 MOTEUR PNEUMATIQUE	CONNECTION for 1 AIR-MOTOR		1
TTNGxxx-1100 **(1*)**	CORPS DE MACHINE COMMUN-TTNG	COMMON TTNG MACHINE BODY		1

(1*) xxx: specify the model of machine

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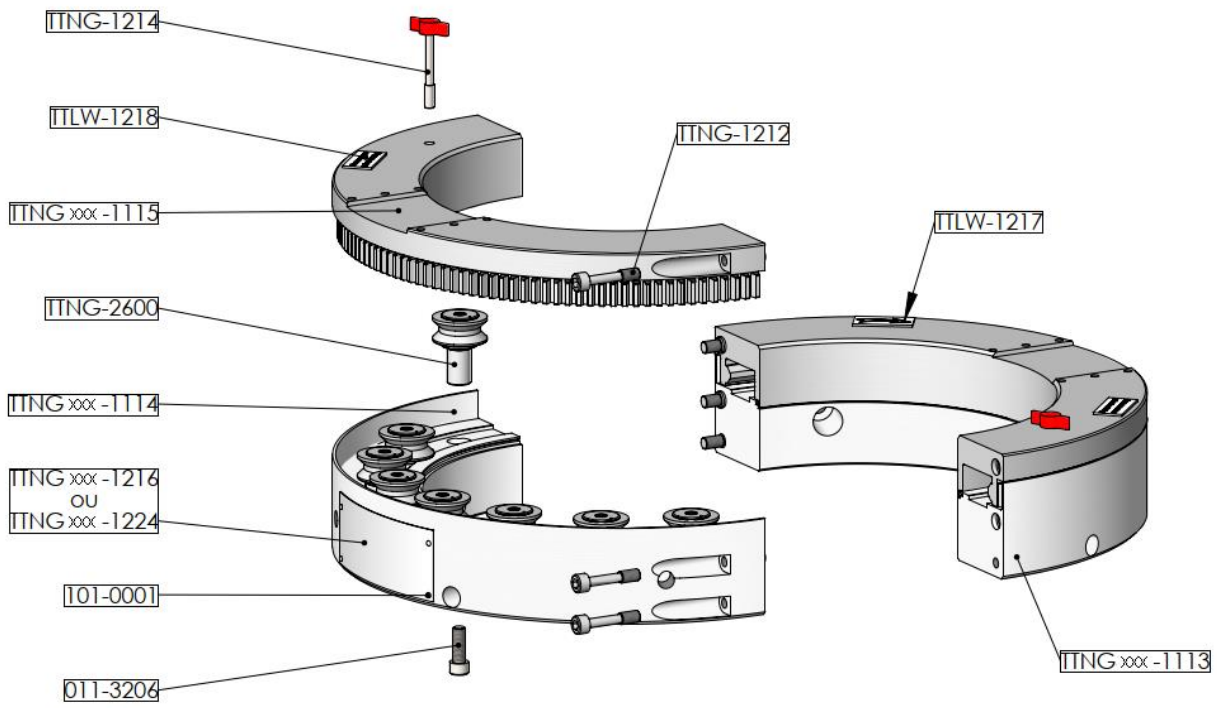

TTNG-323-1100EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty			
				TTNG168	TTNG219	TTNG273	TTNG323
011-3206	Vis	Screw		16	16	16	16
101-0001	RIVET - 2	RIVET – 2		4	4	4	4
TTLW-1218	PLAQUE ROTATION "Remove screws prior to rotating"	"Remove screws prior to rotating" ROTATION PLATE		2	2	2	2
TTLW-1217	PLAQUE FLECHE	ARROW PLATE		1	1	1	1
TTNG-1212	VIS DE SERRAGE-COURONNE TTNG-114 à 1016	TTNG-114 to 1016 CROWN-WHEEL TIGHTENING SCREW		6	6	6	6
TTNG-1214	VIS DE BLOCAGE-COURONNE TTNG-219	TTNG-219 CROWN-WHEEL LOCKING SCREW		2	2	2	2
TTNG-2600	ENSEMBLE GALET	V-BEARING UNIT		**10**	**12**	**16**	**16**
TTNGxxx-1113 **(1*)**	DEMI-CORPS MOTEUR-TTNG	TTNG MOTOR HALF-BODY		1	1	1	1
TTNGxxx-1114 **(1*)**	DEMI-CORPS MOTEUR-TTNG	TTNG MOTOR HALF-BODY		1	1	1	1
TTNGxxx-1115 **(1*)**	DEMI-PLATEAU PORTE-OUTIL-TTNG	TTNG TOOL-HOLDER HALF-PLATE		2	2	2	2
TTNGxxx-1216 **(1*)**	PLAQUE CONSTRUCTEUR-TTNG	TTNG CONSTRUCTOR'S PLATE		1	1	1	1
TTNGxxx-1224 **(1*)**	PLAQUE CONSTRUCTEUR …	TTNG CONSTRUCTOR'S PLATE		1	1	1	1

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1*: xxx = specify the model of machine

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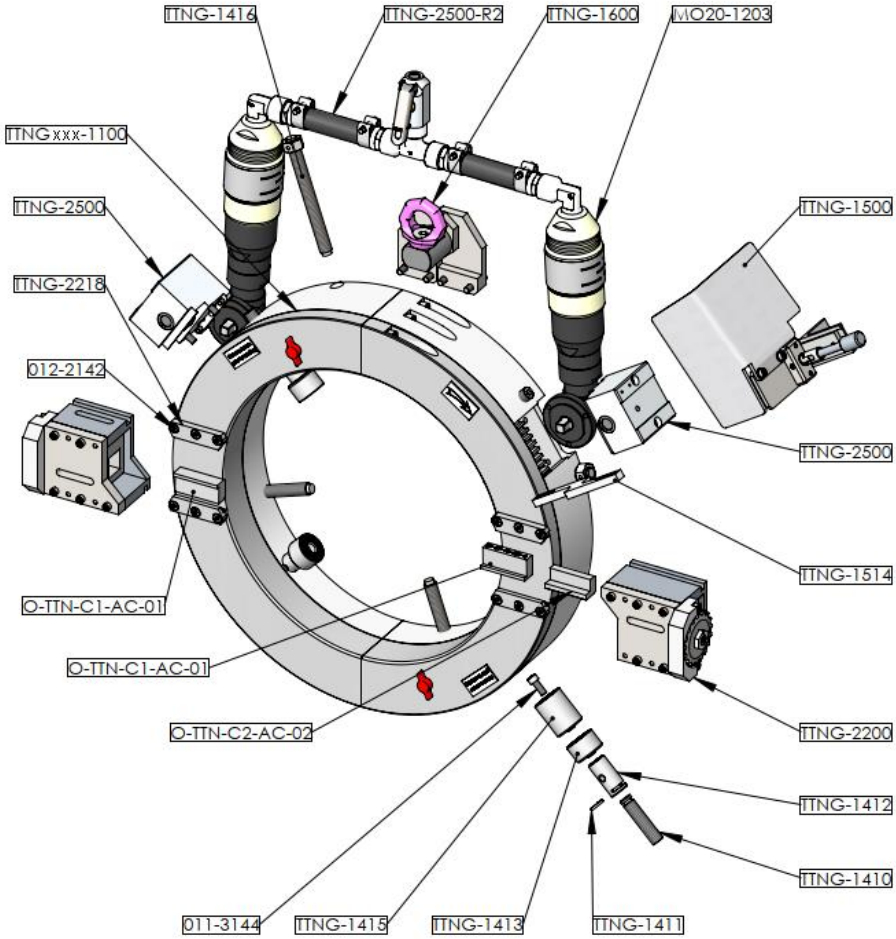
- **TTNG 406 to TTNG 508 air-motor**



TTNG-406-1000EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty	
				TTNG406	TTNG508
011-3144	Vis	Screw		4	4
012-2142	Vis	Screw		12	12
MO20-1203	MO20-ROT-D-2ET-9/12-RA-CARREE	MO20-ROT-D-2ET-9/12-RA-SQUARE		2	2
O-TTN-C1-AC-01	CALE-N°1 pour TT1PL/TT1PT	SHIM-N°1 for TT1PL/TT1PT		2	2
O-TTN-C2-AC-02	CALE-N°2 pour TT2/TT3/TT4	SHIM-N°2 for TT2/TT3/TT4		1	1
TTNG-1410	VIS DE PRESSION	Pressure screw		4	8
TTNG-1411	DEMI-RONDELLE	Half-washer		4	8
TTNG-1412	MORS DE BASE	Base jaw		4	8
TTNG-1413	PATIN SOUS MORS-LG. 25mm	pad under25mm jaw		4	8
TTNG-1414	PATIN SOUS MORS-LG. 75mm	pad under 75mm jaw		0	8

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TTNG-1415	PATIN SOUS MORS-LG. 50mm	pad under 50mm jaw		4	8
TTNG-1416	VIS DE MORS	Jaw screw		4	4
TTNG-1500	SOUS-ENSEMBLE EMBRAYAGE TTNG-168 à 508	CLUTCH SUB-ASSEMBLY TTNG 168 TO TTNG 508		1	1
TTNG-1514	CALE DE REGLAGE EMBRAYAGE	CLUTCH ADJUSTMENT SHIM		1	1
TTNG-1600	SOUS-ENSEMBLE CHARNIERE TTNG-168 à TT 508	HINGE SUB-ASSEMBLY TTNG-168 to TT 508		1	1
TTNG-2200	CHARIOT-COURSE 50	50mm traverse carriage		2	2
TTNG-2218	BARRETTE DE FIXATION	HOLDING BAR		4	4
TTNG-2500	BOITIER MOTORISATION PNEUMATIQUE TTNG-168 à 610	AIR-MOTOR DRIVE BOX TTNG-168 to 610		2	2
TTNG-2500-R2	Raccordement direct 2 moteurs	Direct connection to two motors		1	1
TTNGxxx-1100 **(1*)**	CORPS DE MACHINE COMMUN-TTNG	COMMON TTNG MACHINE BODY		1	1

1*: xxx = specify the model of machine

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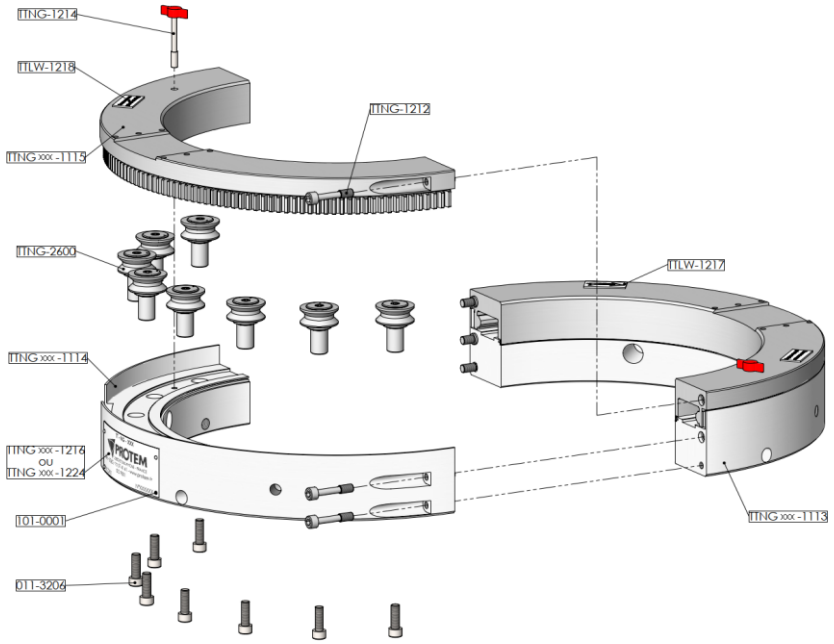

TTNG-406-1100EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty	
				TTNG406	TTNG508
011-3206	Vis	Screw		16	16
101-0001	RIVET	RIVET		4	4
TTLW-1218	PLAQUE ROTATION "Remove screws prior to rotating"	"Remove screws prior to rotating" ROTATION PLATE		2	2
TTLW-1217	PLAQUE FLECHE	ARROW PLATE		1	1
TTNG-1212	VIS DE SERRAGE-COURONNE TTNG-114 à 1016	TTNG-114 to 1016 CROWN-WHEEL TIGHTENING SCREW		6	6
TTNG-1214	VIS DE BLOCAGE-COURONNE TTNG-219	TTNG-219 CROWN-WHEEL LOCKING SCREW		2	2
TTNG-2600	ENSEMBLE GALET	V-BEARING UNIT		**16**	**20**
TTNGxxx-1113 **(1*)**	DEMI-CORPS MOTEUR-TTNG	TTNG MOTOR HALF-BODY		1	1
TTNGxxx-1114 **(1*)**	DEMI-CORPS MOTEUR-TTNG	TTNG MOTOR HALF-BODY		1	1
TTNGxxx-1115 **(1*)**	DEMI-PLATEAU PORTE-OUTIL-TTNG	TTNG TOOL-HOLDER HALF-PLATE		2	2
TTNGxxx-1216 **(1*)**	PLAQUE CONSTRUCTEUR-TTNG	TTNG CONSTRUCTOR'S PLATE		1	1
TTNGxxx-1224 **(1*)**	PLAQUE CONSTRUCTEUR …	CONSTRUCTOR'S PLATE		1	1

1*: xxx = specify the model of machine

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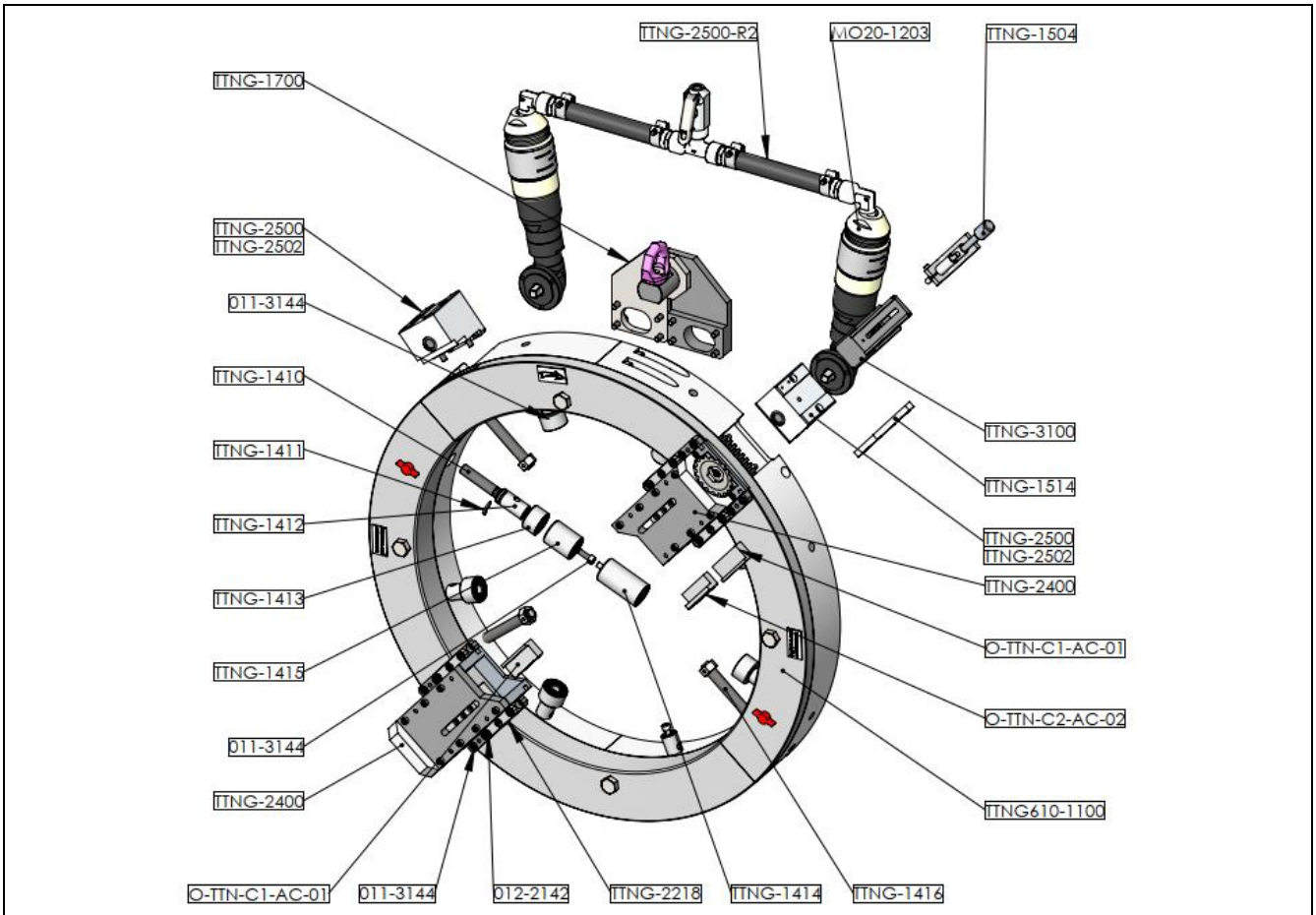
TTNG 610 to TTNG 762 air-motor



TTNG-610-1100EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty	
				TTNG610	TTNG762
011-3144	VIS	screw		8	8
012-2142	VIS	screw		12	12
MO20-1203	MO20-ROT-D-2ET-9/12-RA-CARREE	MO20-ROT-D-2ET-9/12-RA-SQUARE		2	2
O-TTN-C1-AC-01	CALE-N°1 pour TT1PL/TT1PT	SHIM-N°1 for TT1PL/TT1PT		1	1
O-TTN-C2-AC-02	CALE-N°2 pour TT2/TT3/TT4	SHIM-N°2 for TT2/TT3TT4		1	1
TTNG-1410	VIS DE PRESSION	Pressure screw		8	8
TTNG-1411	DEMI-RONDELLE	Half-washer		8	8
TTNG-1412	MORS DE BASE	BASE JAW		8	8
TTNG-1413	PATIN SOUS MORS-LG. 25mm	pad under 25mm jaw		8	8
TTNG-1414	CALE SOUS MORS-LG. L=75mm	Shim under 75mm jaw		8	8

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TTNG-1415	PATIN SOUS MORS-LG. 50mm	Pad under 50mm jaw		8	8
TTNG-1416	VIS DE MORS	Jaw screw		4	4
TTNG-1504	SOUS-ENSEMBLE EMBRAYAGE TTNG-610 à 1016 avec 3100	CLUTCH SUB-ASSEMBLY TTNG 610 TO TTNG 1016 with 3100		1	1
TTNG-1514	CALE DE REGLAGE EMBRAYAGE	CLUTCH ADJUSTMENT SHIM		1	1
TTNG-1700	SOUS-ENSEMBLE CHARNIERE TTNG-610 à 1016	HINGE SUB-ASSEMBLY TTNG-610 to TTNG 1016		1	1
TTNG-2218	BARRETTE DE FIXATION	HOLDING BAR		4	4
TTNG-2400	CHARIOT-COURSE 100mm	100mm traverse carriage		2	2
TTNG-2500	BOITIER MOTORISATION PNEUMATIQUE TTNG 168 à 610	AIR-MOTOR DRIVE BOX TTNG 168 to 610		**2**	**0**
TTNG-2502	BOITIER MOTORISATION PNEUMATIQUE TTNG762 à 1016	AIR-MOTOR DRIVE BOX TTNG 762 to 1016		**0**	**2**
TTNG-2500-R2	RACCORDEMENT 2 MOTEURS PNEUMATIQUES	CONNECTION for 2 AIR-MOTOR		1	1
TTNG-3100	ENSEMBLE KIT D'EXTENSION TOUTE CAPACITE	EXTENSION KIT ASSEMBLY FOR ALL CAPACITIES		1	1
TTNG-XXX-1100 **(1*)**	CORPS DE MACHINE COMMUN-TTNG	COMMON TTNG MACHINE BODY		1	1
1*: xxx = specify the model of machine					

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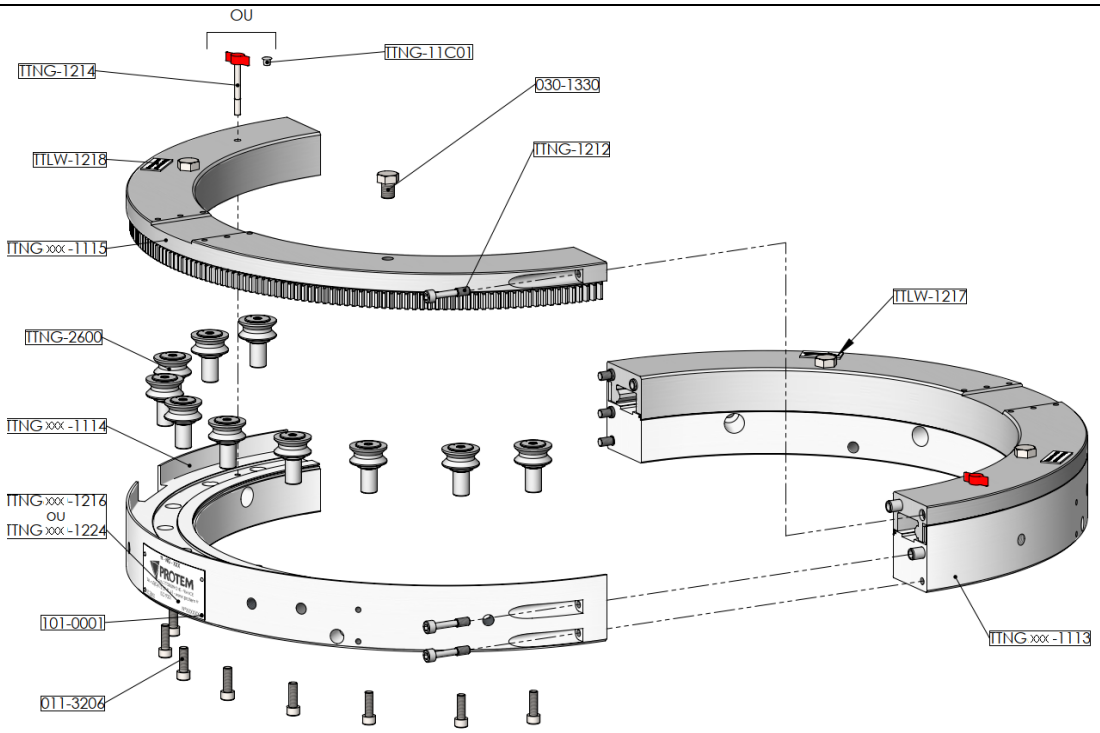

TTNG-610-1100EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty	
				TTNG610	TTNG762
011-3206	Vis	Screw		20	20
030-1330	Vis	Screw		4	4
101-0001	RIVET	RIVET		4	4
TTLW-1218	PLAQUE ROTATION "Remove screws prior to rotating"	"Remove screws prior to rotating" ROTATION PLATE		2	2
TTLW-1217	PLAQUE FLECHE	ARROW PLATE		1	1
TTNG-11C01	BOUCHON PLASTIQUE	Plastic plug		2	2
TTNG-1212	VIS DE SERRAGE-COURONNE TTNG-168 à 1016	TTNG-168 to 1016 CROWN-WHEEL TIGHTENING SCREW		6	6
TTNG-1214	VIS DE BLOCAGE-COURONNE	Crown-wheel clamping screw		2	2
TTNG-2600	ENSEMBLE GALET	V-BEARING UNIT		**20**	**28**
TTNGxxx-1113 **(1*)**	DEMI-CORPS MOTEUR-TTNG	TTNG MOTOR HALF-BODY		1	1
TTNGxxx-1114 **(1*)**	DEMI-CORPS MOTEUR-TTNG	TTNG MOTOR HALF-BODY		1	1
TTNGxxx-1115 **(1*)**	DEMI-PLATEAU PORTE-OUTIL-TTNG	TTNG TOOL-HOLDER HALF-PLATE		2	2
TTNGxxx-1216 **(1*)**	PLAQUE CONSTRUCTEUR-TTNG	TTNG CONSTRUCTOR'S PLATE		1	1
TTNGxxx-1224 **(1*)**	PLAQUE CONSTRUCTEUR …	CONSTRUCTOR'S PLATE		1	1

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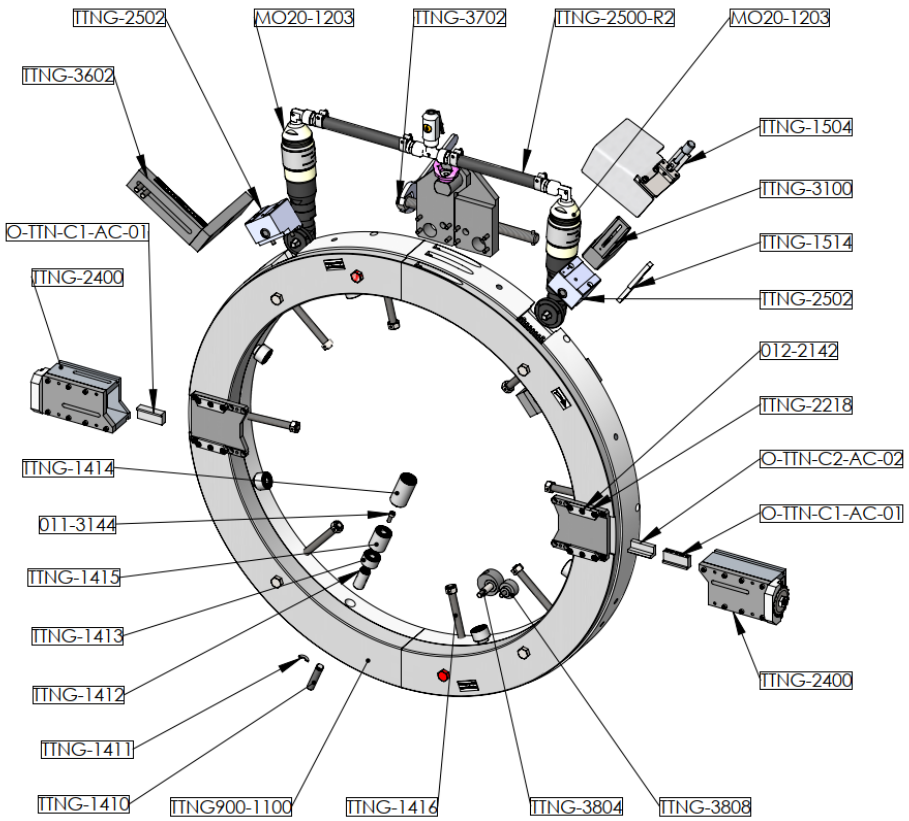
- **TTNG 900 air-motor**



TTNG-900-1000EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3144	Vis	Screw		8
012-2142	Vis	Screw		12
MO20-1203	MO20-ROT-D-2ET-9/12-RA-CARREE	MO20-ROT-D-2ET-9/12-RA-SQUARE		2
O-TTN-C1-AC-01	CALE-N°1 pour TT1PL/TT1PT	SHIM-N°1 for TT1PL/TT1PT		2
O-TTN-C2-AC-02	CALE-N°2 pour TT2/TT3/TT4	SHIM-N°2 for TT2/TT3/TT4		1
TTNG-1410	VIS DE PRESSION	Pressure screw		8
TTNG-1411	DEMI-RONDELLE	Half-washer		8
TTNG-1412	MORS DE BASE	BASE JAW		8
TTNG-1413	PATIN SOUS MORS-LG. 25mm	pad under 25mm jaw		8
TTNG-1414	CALE SOUS MORS-LG. 75mm	shim under 75mm jaw		8
TTNG-1415	PATIN SOUS MORS-LG. 50mm	pad under 50mm jaw		8
TTNG-1416	VIS DE MORS	Jaw screw		8
TTNG-1504	SOUS-ENSEMBLE EMBRAYAGE TTNG-610 à 1016 avec 3100	CLUTCH SUB-ASSEMBLY TTNG 610 TO TTNG 1016 with 3100		1

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TTNG-1514	CALE DE REGLAGE EMBRAYAGE	CLUTCH ADJUSTMENT SHIM		1
TTNG-2218	BARRETTE DE FIXATION	HOLDING BAR		4
TTNG-2400	CHARIOT-COURSE 100mm	100mm traverse carriage		2
TTNG-2500-R2	RACCORDEMENT 2 MOTEURS PNEUMATIQUES	CONNECTION for 2 AIR-MOTOR		1
TTNG-2502	BOITIER MOTORISATION PNEUMATIQUE TTNG-762 à 1016	AIR-MOTOR DRIVE BOX TTNG 762 to 1016		2
TTNG-3100	ENSEMBLE KIT D'EXTENSION TOUTE CAPACITE	EXTENSION KIT ASSEMBLY FOR ALL CAPACITIES		1
TTNG-3602	ENSEMBLE EQUERRE TTNG508 à 1016	SET SQUARE ASSEMBLY TTNG 508 to 1016		2
TTNG-3702	ENSEMBLE CHARNIERE A OUVERTURE TTNG610 à 1016	OPENING HINGE ASSEMBLY TTNG 610 to 1016		1
TTNG-3804	ENSEMBLE CAME TTNG168 à 1400	CAM ASSEMBLY TTNG 168 to 1400		1
TTNG-3808	ENSEMBLE BUTEE TTNG168 à 1016	STOP ASSEMBLY TTNG 168 to 1016		1
TTNG900-1100	CORPS DE MACHINE COMMUN-TTNG900	TTNG 900 COMMON MACHINE BODY		1

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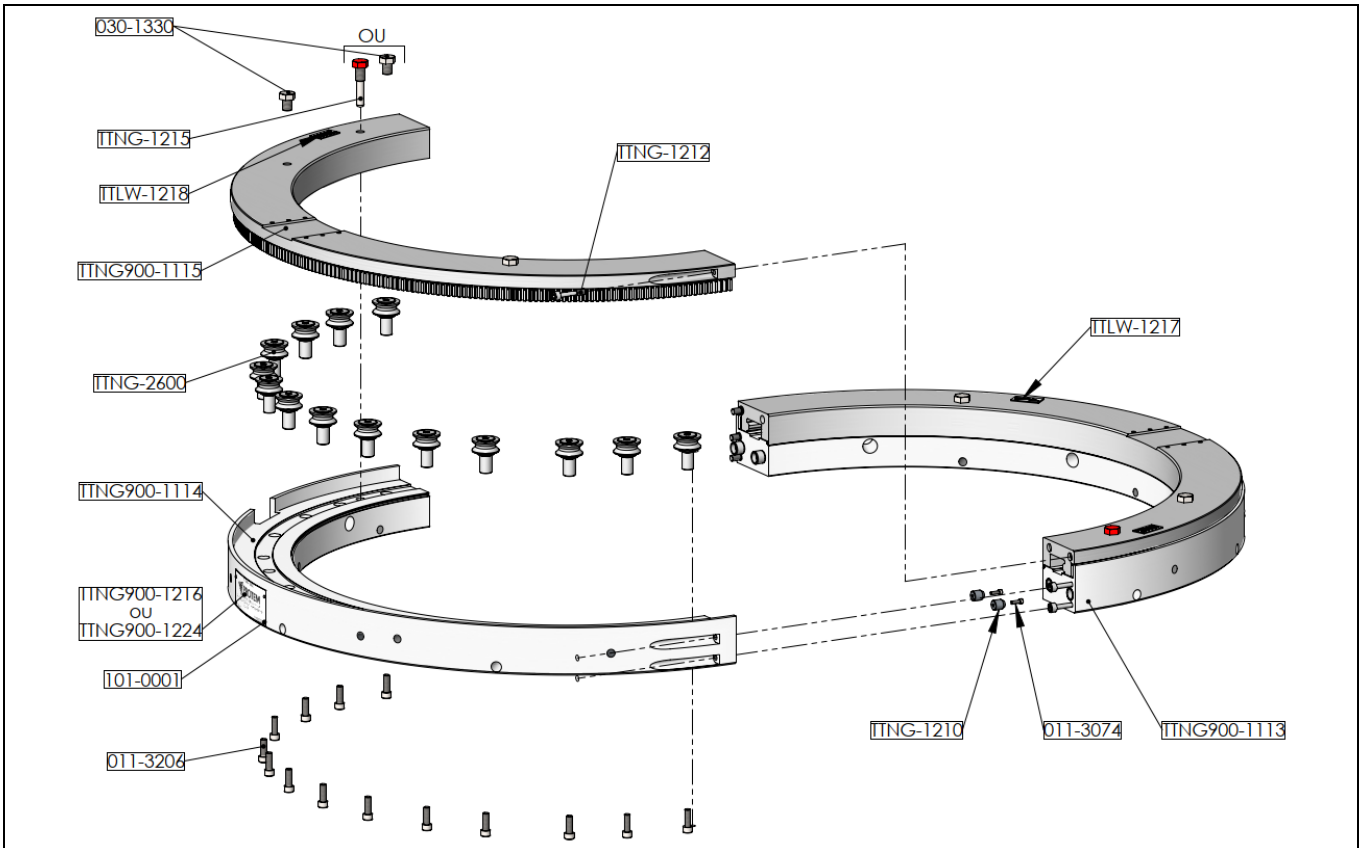

TTNG-900-1100EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3074	Vis	Screw		4
011-3206	Vis	Screw		28
030-1330	Vis	Screw		5
101-0001	RIVET	RIVET		4
TTLW-1218	PLAQUE ROTATION "Remove screws prior to rotating"	"Remove screws prior to rotating" ROTATION PLATE		2
TTLW-1217	PLAQUE FLECHE	ARROW PLATE		1
TTNG-1210	Cône de centrage TTNG 900 et plus	Centering cone for TTNG 900 and larger		4
TTNG-1212	VIS DE SERRAGE-COURONNE TTNG-168 à 1016	TTNG-168 to 1016 CROWN-WHEEL TIGHTENING SCREW		6
TTNG-1215	Vis de blocage couronnes TTNG 900 et 1016	Blocking screw for TTNG 900 and 1016 crown-wheels		2
TTNG-2600	ENSEMBLE GALET	V-BEARING UNIT		28
TTNG900-1113	DEMI-CORPS MOTEUR-TTNG900	TTNG 900 MOTOR HALF-BODY		1
TTNG900-1114	DEMI-CORPS MOTEUR-TTNG900	TTNG 900 MOTOR HALF-BODY		1
TTNG900-1115	DEMI-PLATEAU PORTE-OUTIL-TTNG900	TTNG 900 TOOL-HOLDER HALF-PLATE		2

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TTNG900-1216	PLAQUE CONSTRUCTEUR-TTNG900	TTNG 900 CONSTRUCTOR'S PLATE		1
TTNG900-1224	PLAQUE CONSTRUCTEUR …	CONSTRUCTOR'S PLATE		1

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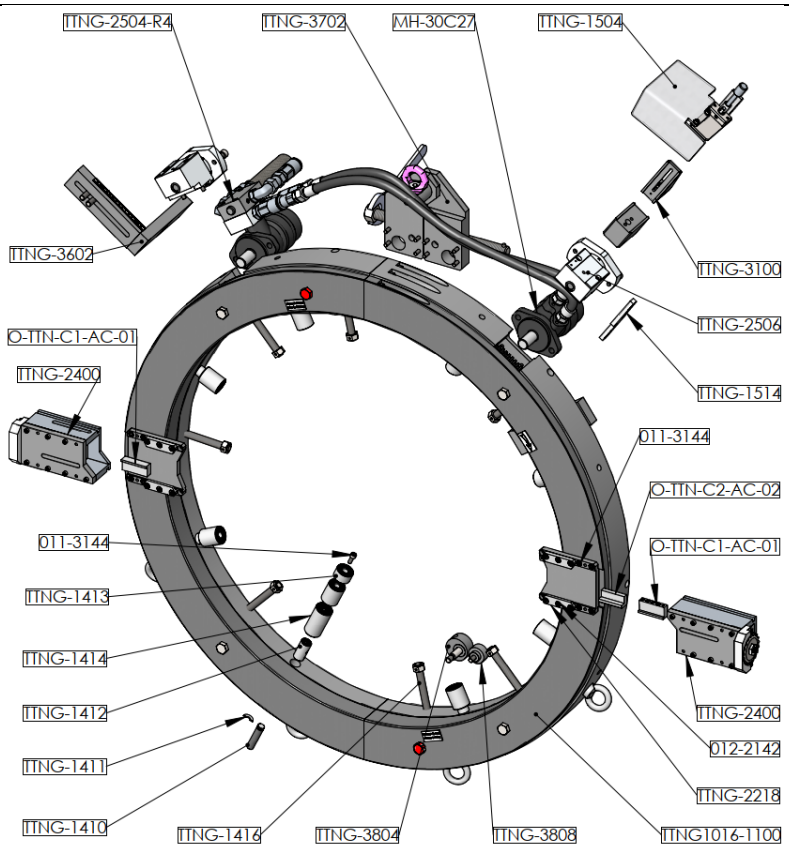
- **TTNG 1016 hydraulic motor**



TTNG-1016-1060EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3144	Vis	Screw		8
012-2142	Vis	Screw		12
MH-30C27	MOTEUR HYDRAULIQUE	HYDRAULIC MOTOR		2
O-TTN-C1-AC-01	CALE-N°1 pour TT1PL/TT1PT	SHIM-N°1 for TT1PL/TT1PT		2
O-TTN-C2-AC-02	CALE-N°2 pour TT2/TT3/TT4	SHIM-N°2 for TT2PL/TT3/TT4		1
TTNG-1410	VIS DE PRESSION	Pressure screw		8
TTNG-1411	DEMI-RONDELLE	Half-washer		8
TTNG-1412	MORS DE BASE	BASE JAW		8
TTNG-1413	PATIN SOUS MORS-LG. 25mm	pad under 25mm jaw		8
TTNG-1414	CALE SOUS MORS-LG. 75mm	shim under 75mm jaw		8
TTNG-1415	PATIN SOUS MORS-LG. 50mm	pad under 50mm jaw		8

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TTNG-1416	VIS DE MORS	Jaw screw		8
TTNG-1504	SOUS-ENSEMBLE EMBRAYAGE TTNG-610 à 1016 avec 3100	CLUTCH SUB-ASSEMBLY TTNG 610 TO TTNG 1016 with 3100		1
TTNG-1514	CALE DE REGLAGE EMBRAYAGE	CLUTCH ADJUSTMENT SHIM		1
TTNG-2218	BARRETTE DE FIXATION	HOLDING BAR		4
TTNG-2400	CHARIOT-COURSE 100mm	100mm traverse carriage		2
TTNG-2504-R4	RACCORDEMENT 2 MOTEURS HYDRAULIQUES+VANNE D'INVERSION-CFP-MF 1/2"	CONNECTION TO TWO HYDRAULIC MOTORS + CFP-MF 1/2" REVERSING VALVE		1
TTNG-2506	BOITIER MOTORISATION HYDRAULIQUE TTNG-762 à 1016	HYDRAULIC MOTOR DRIVE BOX TTNG 762 to 1016		2
TTNG-3100	ENSEMBLE KIT D'EXTENSION TOUTE CAPACITE	EXTENSION KIT ASSEMBLY FOR ALL CAPACITIES		1
TTNG-3602	ENSEMBLE EQUERRE TTNG508 à 1016	SET SQUARE ASSEMBLY TTNG 508 to 1016		2
TTNG-3702	ENSEMBLE CHARNIERE A OUVERTURE TTNG610 à 1016	OPENING HINGE ASSEMBLY TTNG 610 to 1016		1
TTNG-3804	ENSEMBLE CAME TTNG168 à 1400	CAM ASSEMBLY TTNG 168 to 1400		1
TTNG-3808	ENSEMBLE BUTEE TTNG168 à 1016	STOP ASSEMBLY TTNG 168 to 1016		1
TTNG1016-1100	CORPS DE MACHINE COMMUN-TTNG1016	TTNG 900 COMMON MACHINE BODY		1

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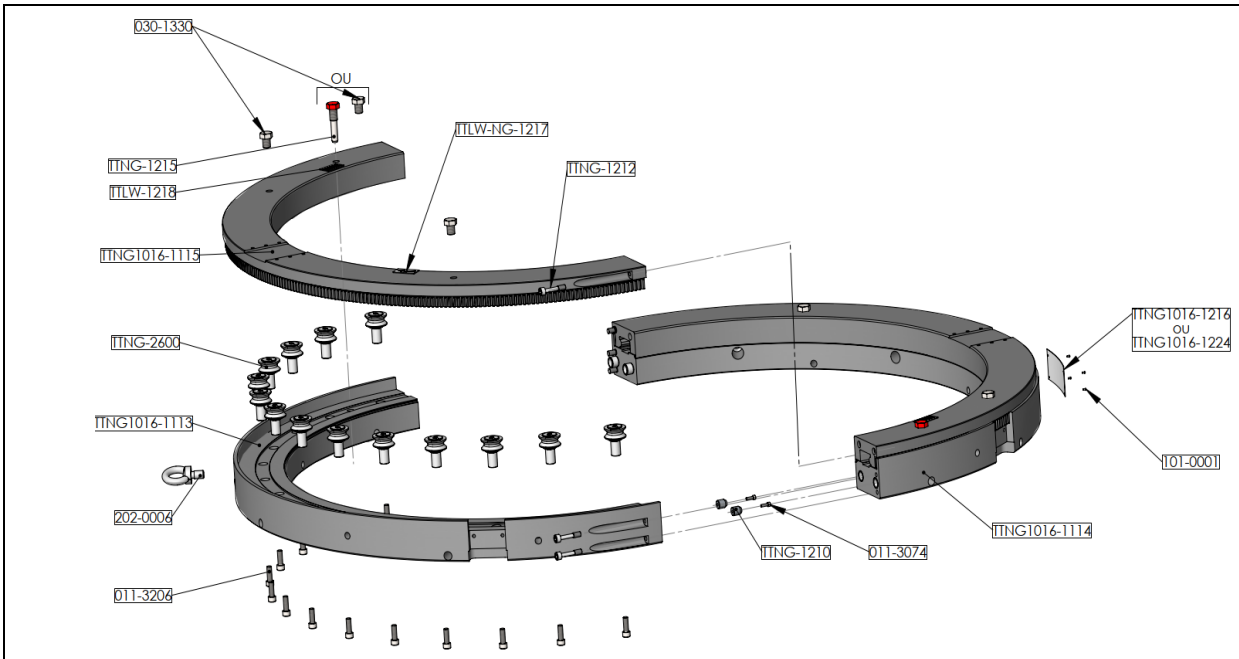

TTNG-1016-1100EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3074	Vis	Screw		4
011-3206	Vis	Screw		28
030-1330	Vis	Screw		5
101-0001	RIVET	RIVET		4
202-0006	ANNEAU LEVAGE FIXE-MALE-ACIER	FIXED MALE STEEL LIFTING EYE		4
TTLW-1218	PLAQUE ROTATION "Remove screws prior to rotating"	"Remove screws prior to rotating" ROTATION PLATE		2
TTLW-1217	PLAQUE FLECHE	ARROW PLATE		1
TTNG-1210	Cône de centrage TTNG 900 et plus	Centering cone for TTNG 900 and larger		4
TTNG-1212	VIS DE SERRAGE-COURONNE TTNG-168 à 1016	TTNG-168 to 1016 CROWN-WHEEL TIGHTENING SCREW		6
TTNG-1215	Vis de blocage couronnes TTNG 900 et 1016	Blocking screw for TTNG 900 and 1016 crown-wheels		2
TTNG-2600	ENSEMBLE GALET	V-BEARING UNIT		28
TTNG1016-1113	DEMI-CORPS MOTEUR-TTNG1016	TTNG 1016 MOTOR HALF-BODY		1
TTNG1016-1114	DEMI-CORPS MOTEUR-TTNG1016	TTNG 1016 MOTOR HALF-BODY		1
TTNG1016-1115	DEMI-PLATEAU PORTE-OUTIL-TTNG1016	TTNG 1016 TOOL-HOLDER HALF-PLATE		2
TTNG1016-1216	PLAQUE CONSTRUCTEUR-TTNG1016	TTNG 1016 CONSTRUCTOR'S PLATE		1
TTNG1016-1224	PLAQUE CONSTRUCTEUR …	CONSTRUCTOR'S PLATE		1

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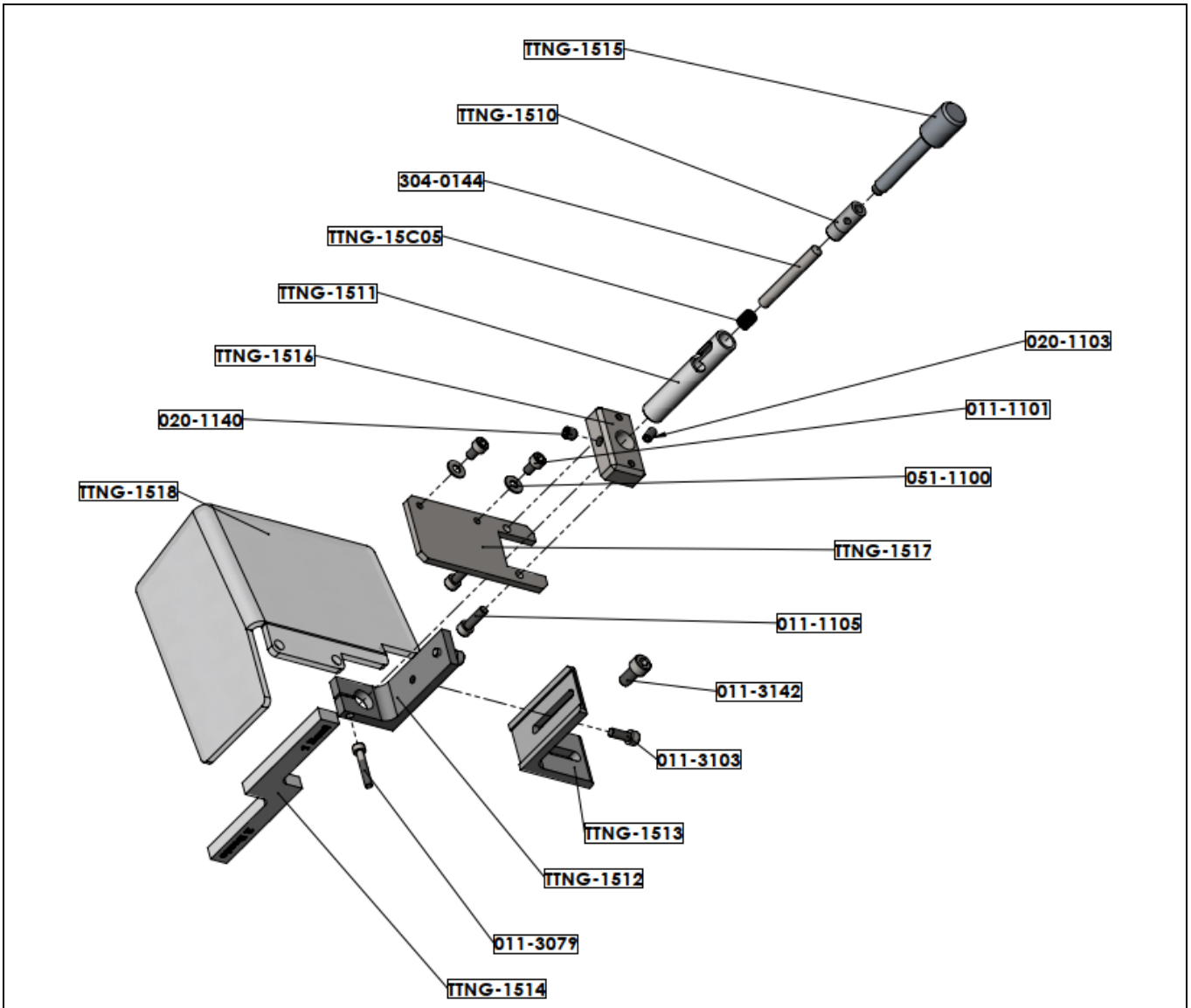
A.10.1 CLUTCH SUB-ASSEMBLY TTNG 168 TO TTNG 508



TTNG-1500EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-1101	Vis	Screw		2
011-1105	Vis	Screw		2
011-3079	Vis	Screw		1
011-3103	Vis	Screw		2
011-3142	Vis	Screw		1
020-1103	Vis	Screw		1
020-1140	Vis	Screw		1
051-1100	RONDELLE	WASHER		2

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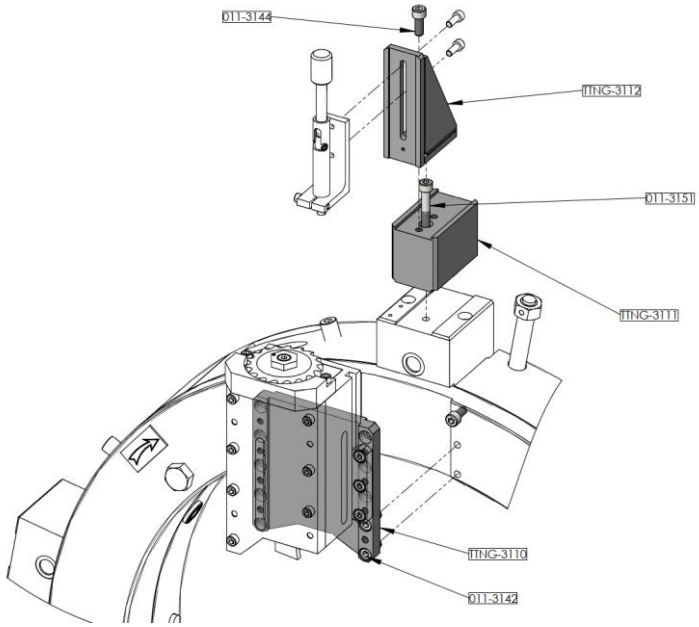
304-0144	GOUPILLE CYLINDRIQUE-ACIER-DIAM.8x65	STEEL DOWEL PIN-DIA. 8x65		1
TTNG-1510	Doigt d'embrayage	Clutch finger		1
TTNG-1511	Corps d'embrayage	Clutch body		1
TTNG-1512	Support embrayage	Clutch support		1
TTNG-1513	Guide embrayage	Clutch guide		1
TTNG-1514	Cale de réglage doigt d'embrayage	Adjustment shim for clutch finger		1
TTNG-1515	Poignée	Knob		1
TTNG-1516	Pavé fixation	Fixture plate		1
TTNG-1517	Tole support	Support sheet		1
TTNG-1518	Carter de protection	Protective housing		1
TTNG-15C05	Ressort de compression	Compression spring		1

A.10.2 CLUTCH SUB-ASSEMBLY TTNG 610 TO TTNG 1016



TTNG-3100EC

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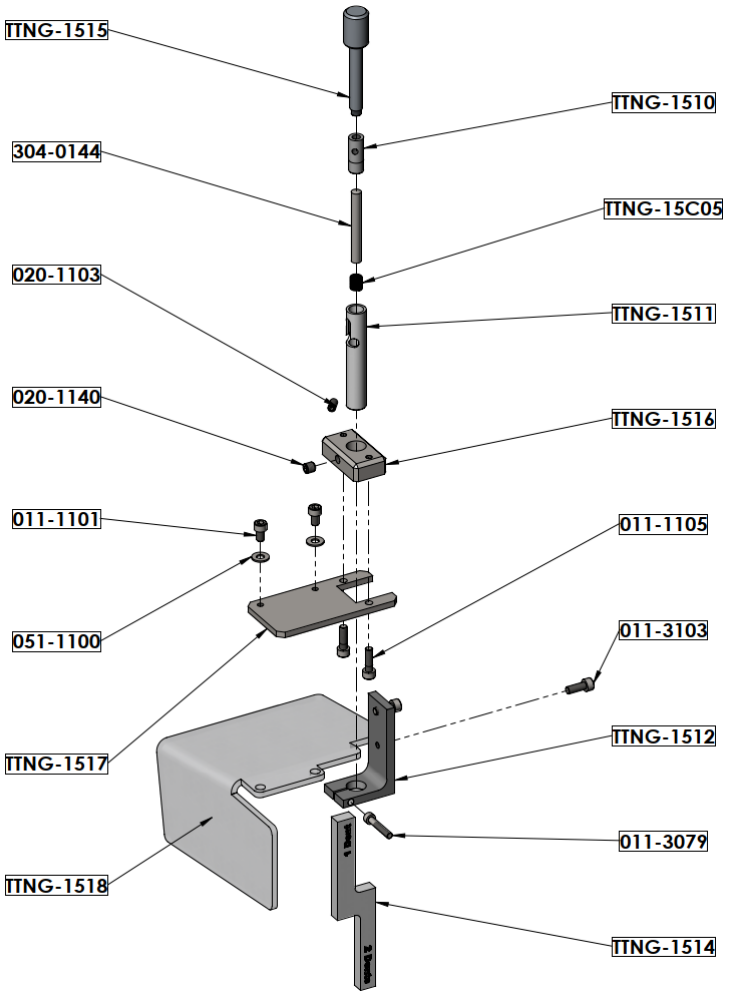

TTNG-1504EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3142	Vis	Screw		12
011-3144	Vis	Screw		1
011-3151	Vis	Screw		1
TTNG-3110	Semelle porte outil	Tool-holder base-plate		2
TTNG-3111	Réhausse embrayage	Clutch riser block		1
TTNG-3112	Guide support embrayage	Clutch support guide		1
011-1101	Vis	Screw		2
011-1105	Vis	Screw		2
011-3079	Vis	Screw		1
011-3103	Vis	Screw		2
020-1103	Vis	Screw		1
020-1140	Vis	Screw		1
051-1100	RONDELLE	WASHER		2
304-0144	GOUPILLE CYLINDRIQUE-ACIER-DIAM	STEEL DOWEL PIN		1
TTNG-1510	Doigt d'embrayage	Clutch finger		1

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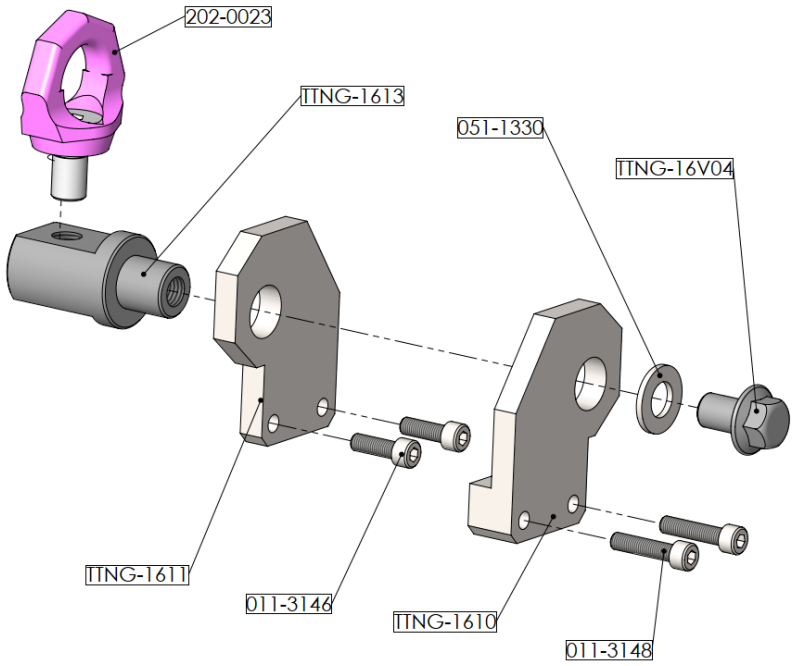
TTNG-1511	Corps d'embrayage	Clutch body		1
TTNG-1512	Support embrayage	Clutch support		1
TTNG-1514	Cale de réglage doigt d'embrayage	Adjustment shim for clutch finger		1
TTNG-1515	Poignée	Knob		1
TTNG-1516	Pavé fixation	Fixture plate		1
TTNG-1517	Tole support	Support sheet		1
TTNG-1518	Carter de protection	Protective housing		1
TTNG-15C05	Ressort de compression	Compression spring		1

A.10.3 HINGE SUB-ASSEMBLY TTNG 168 TO TTNG 508



TTNG-1600EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3146	Vis	Screw		2
011-3148	Vis	Screw		2
051-1330	RONDELLE	WASHER		1
202-0023	ANNEAU LEVAGE ARTICULE-MALE-ACIER	ARTICULATED MALE STEEL LIFTING EYE		1
TTNG-1610	Chape mâle	Male yoke		1
TTNG-1611	Chape femelle	Female yoke		1
TTNG-1613	Axe	Shaft		1
TTNG-16V04	Vis	Screw		1

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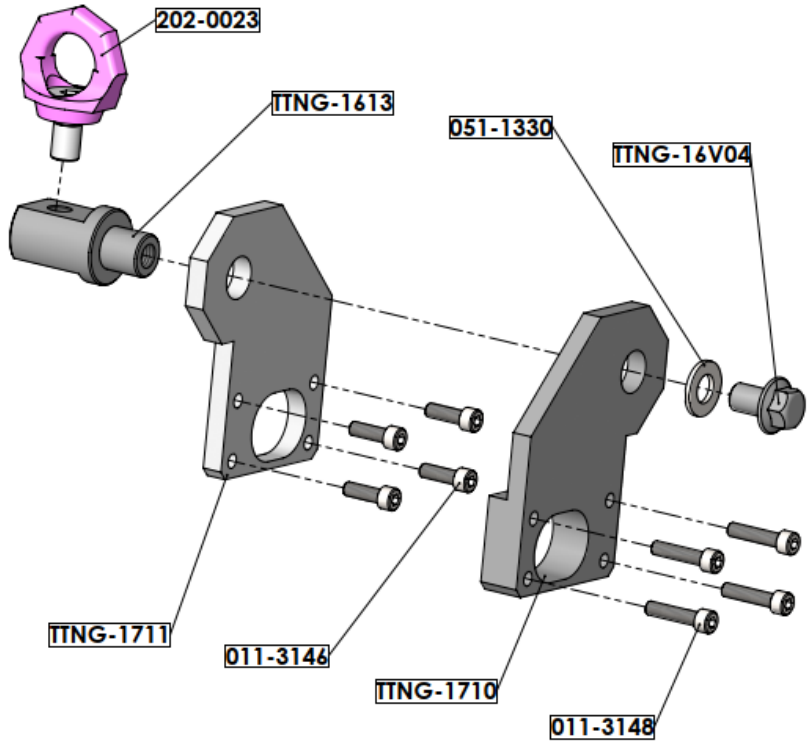
A.10.4 HINGE SUB-ASSEMBLY TTNG 610 TO TTNG 762



TTNG-1700EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3146	Vis	Screw		4
011-3148	Vis	Screw		4
051-1330	RONDELLE	WASHER		1
202-0023	ANNEAU LEVAGE ARTICULE-MALE-ACIER	ARTICULATED MALE STEEL LIFTING EYE		1
TTNG-1613	Axe	Shaft		1
TTNG-16V04	VIS à embase	FLANGE-HEAD SCREW		1
TTNG-1710	Chape mâle	Male yoke		1
TTNG-1711	Chape femelle	Female yoke		1

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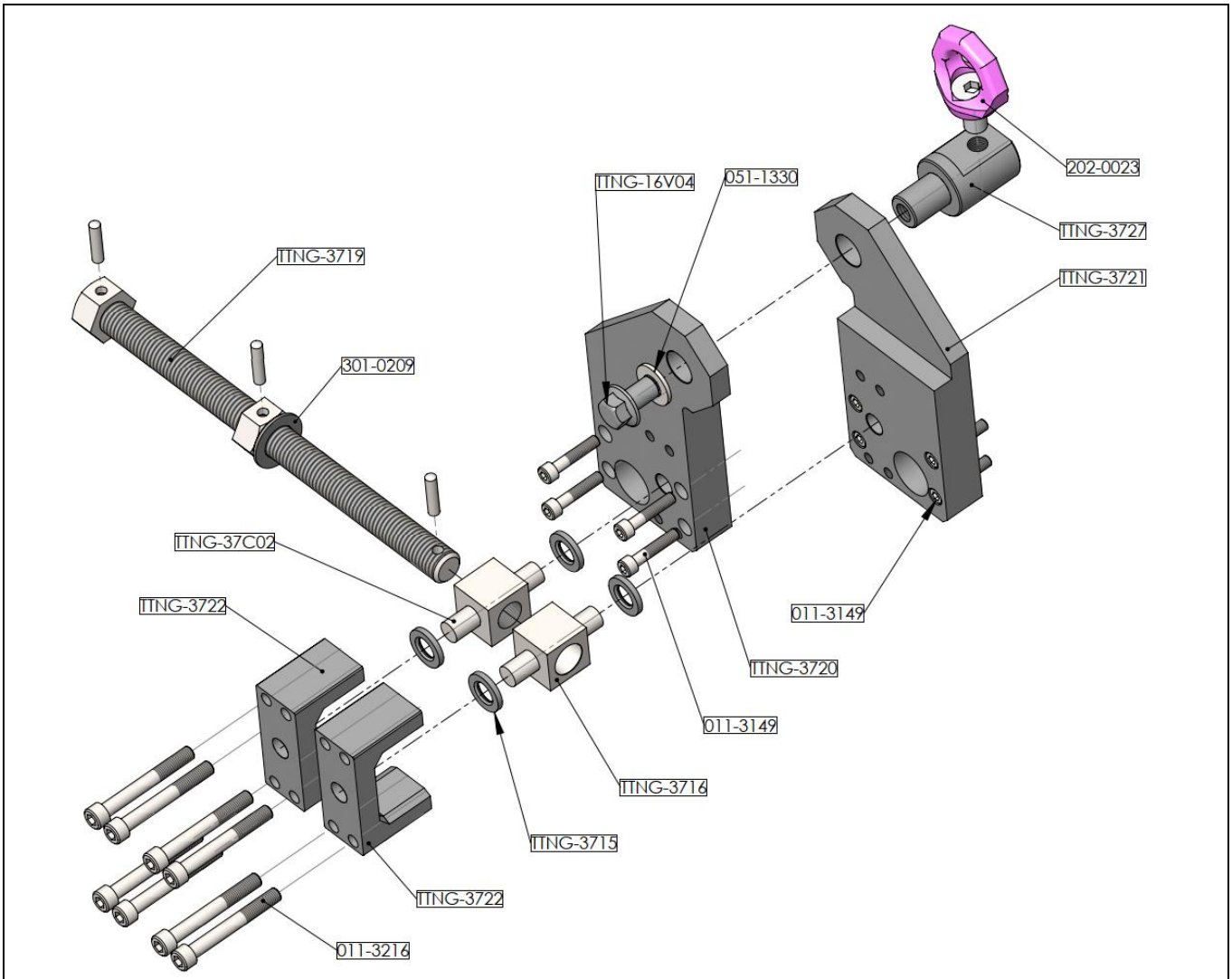
A.10.5 HINGE SUB-ASSEMBLY TTNG 900 TO TTNG 1016



TTNG-3702EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
TTNG-3727	Axe	Shaft		1
TTNG-3715	Entretoise	Spacer		4
TTNG-3716	Ecrou à 2 tenons	2-lug nut		1
TTNG-3719	Vis trapèzoidale + 2x écrous + 3x goupilles	Lead screw + 2x nut + 3x pin		1
TTNG-3720	Chape male	Male yoke		1
TTNG-3721	Chape femelle	Female yoke		1
TTNG-3722	Support écrou	Nut support		2
301-0209	Rondelle mince	Thin washer		1
011-3216	Vis	Screw		8
011-3149	Vis	Screw		8
TTNG-16V04	Vis à embase	flange-head screw		1

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051-1330	Rondelle moyenne	Medium washer		1
TTNG-37C02	Ecrou à 2 tenons	2-lug nut		1
202-0023	Anneau de levage rotatif	rotating hoisting ring		1

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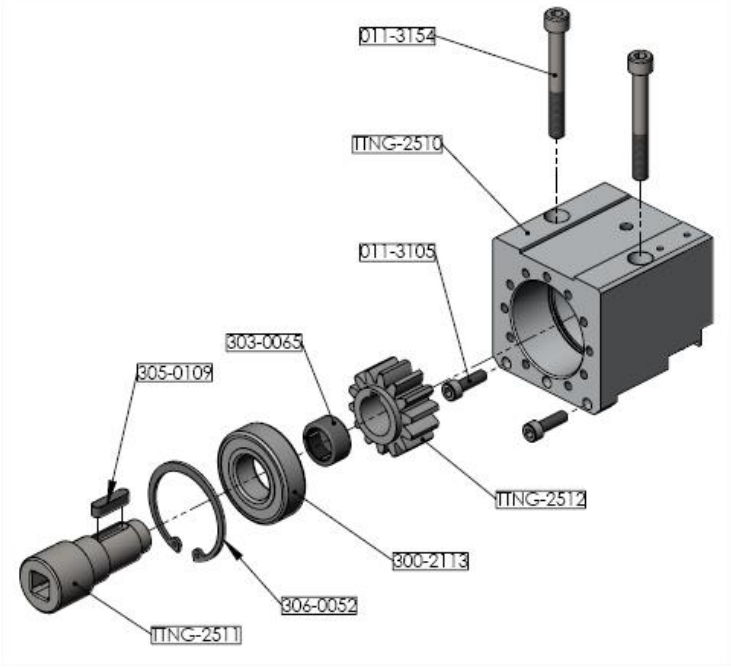
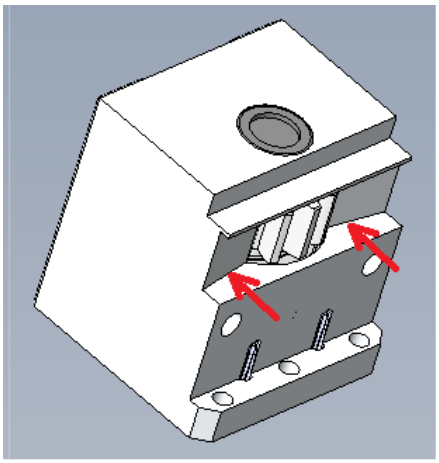
A.10.6 AIR-MOTOR BOX SUB-ASSEMBLY TTNG 168 TO TTNG 610





TTNG-2500EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw		2
011-3154	Vis	Screw		2
300-2113	ROULEMENT A BILLES AVEC FLASQUES	BALL-BEARING WITH FLANGES		1
303-0065	DOUILLE A AIGUILLES	NEEDLE BEARING		1
305-0109	CLAVETTE-A-ACIER	STEEL KEY		1
306-0052	CIRCLIPS INTERIEUR-ACIER	INSIDE STEEL CIRCLIP		1
TTNG-2510	Corps de motorisation TTNG-168 à 610	TTNG-168 to 610 drive unit body		1
TTNG-2511	Axe moteur pneumatique	Air motor shaft		1
TTNG-2512	PIGNON MOTEUR 14 Dents	14-tooth MOTOR GEAR		1

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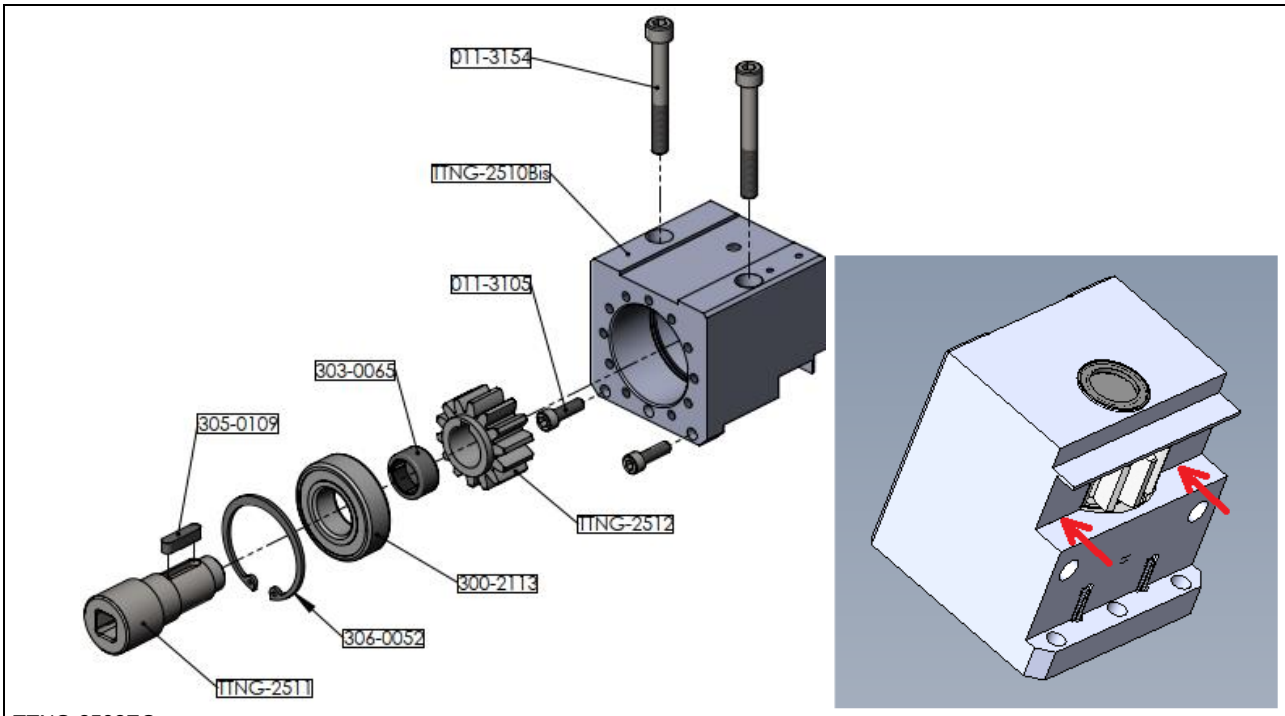
A.10.7 AIR-MOTOR BOX SUB-ASSEMBLY TTNG 762 TO TTNG 1016



TTNG-2502EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw		2
011-3154	Vis	Screw		2
300-2113	ROULEMENT A BILLES AVEC FLASQUES	BALL-BEARING WITH FLANGES		1
303-0065	DOUILLE A AIGUILLES	NEEDLE BEARING		1
305-0109	CLAVETTE-A-ACIER	STEEL KEY		1
306-0052	CIRCLIPS INTERIEUR-ACIER-	INSIDE STEEL CIRCLIP		1
TTNG-2510Bis	Corps de motorisation TTNG-762 à 1016	TTNG-762 to 1016 drive unit body		1
TTNG-2511	Axe moteur pneumatique	Air motor shaft		1
TTNG-2512	PIGNON MOTEUR 14 Dents	14-tooth MOTOR GEAR		1

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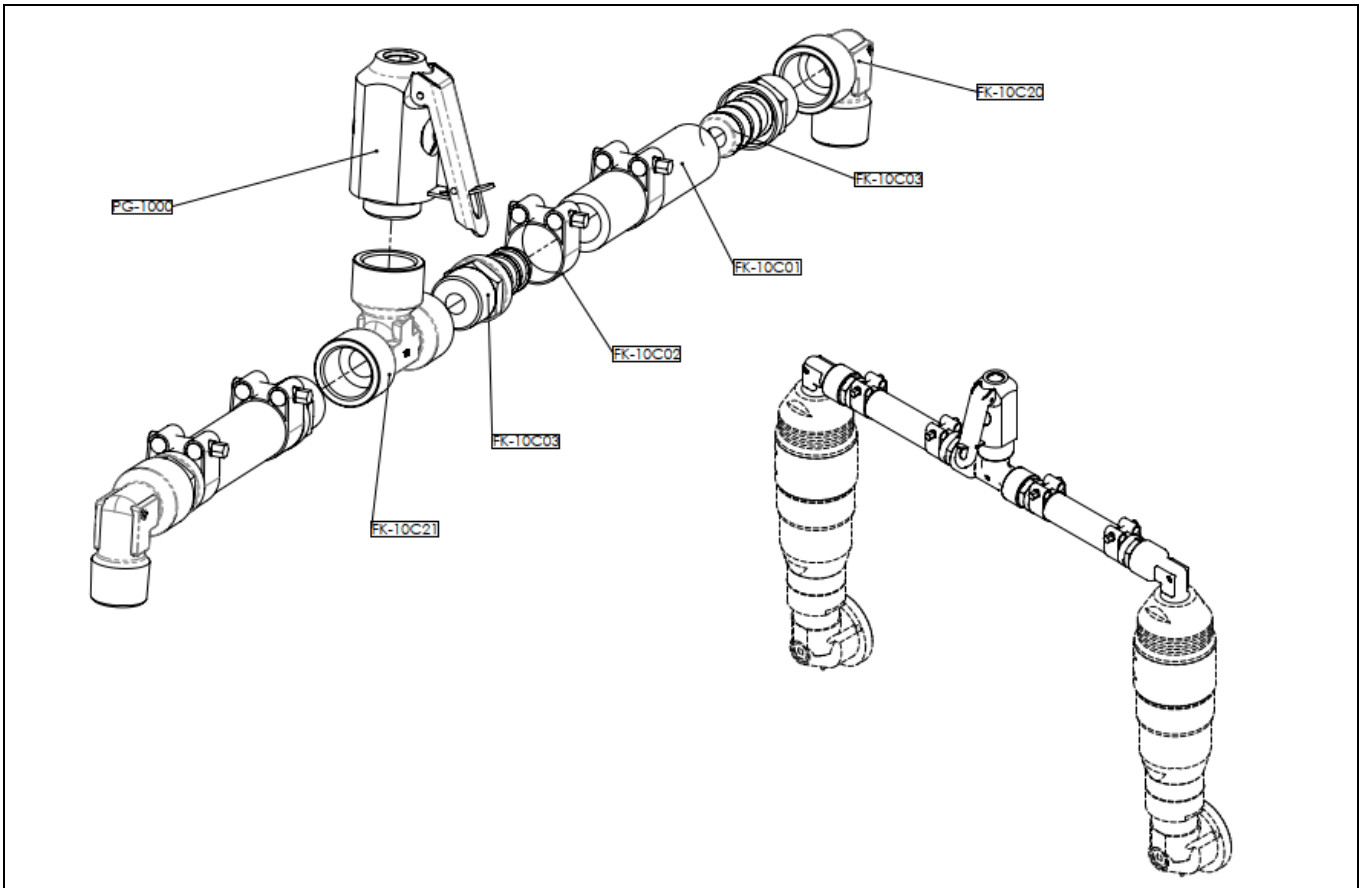
A.10.8 AIR-MOTOR DOUBLE CONNECTION SUB-ASSEMBLY TTNG 406 TO TTNG 900



TTNG-2500EC-R2

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
FK-10C01	TUYAU	PIPE		2
FK-10C02	COLLIER A VIS	JUBILEE CLIP		4
FK-10C03	TETINE-DIAM. 18	NIPPLE - DIA. 18		4
FK-10C20	COUDE-90°-MF 3/4G	MF ELBOW-90 3/4G		2
FK-10C21	TE-FFF 3/4G	TE-FFF 3/4G		1
PG-1000	POIGNEE GACHETTE	DEAD-MAN HANDLE		1

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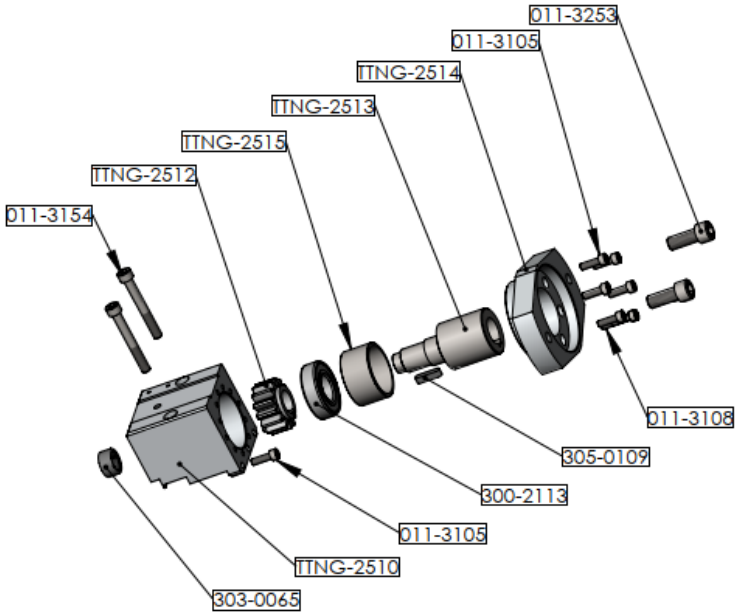
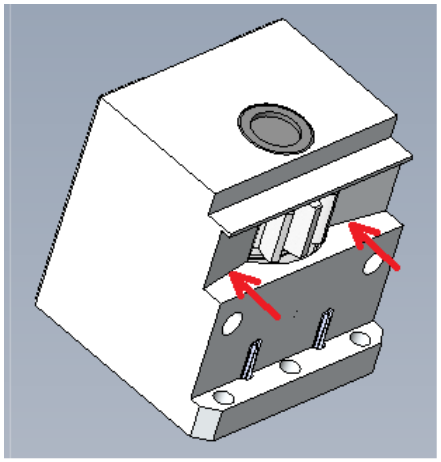
A.10.9 HYDRAULIC MOTOR BOX SUB-ASSEMBLY TTNG 168 TO TTNG 610





TTNG-2504EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw		7
011-3108	Vis	Screw		1
011-3154	Vis	Screw		2
011-3253	Vis	Screw		2
300-2113	ROULEMENT A BILLES AVEC FLASQUES	BALL-BEARING WITH FLANGES		1
303-0065	DOUILLE A AIGUILLES	NEEDLE BEARING		1
305-0109	CLAVETTE-A-ACIER	STEEL KEY		1
TTNG-2510	CORPS DE MOTORISATION TTNG-168 à 610	TTNG-168 to 610 DRIVE UNIT BODY		1
TTNG-2512	PIGNON MOTEUR 14 Dents	14-tooth MOTOR GEAR		1
TTNG-2513	AXE MOTEUR HYDRAULIQUE	HYDRAULIC MOTOR SHAFT		1
TTNG-2514	CLOCHE ACCOUPLEMENT MOTEUR HYDRAULIQUE	HYDRAULIC MOTOR COUPLING HOUSING		1
TTNG-2515	ENTRETOISE	SPACER		1

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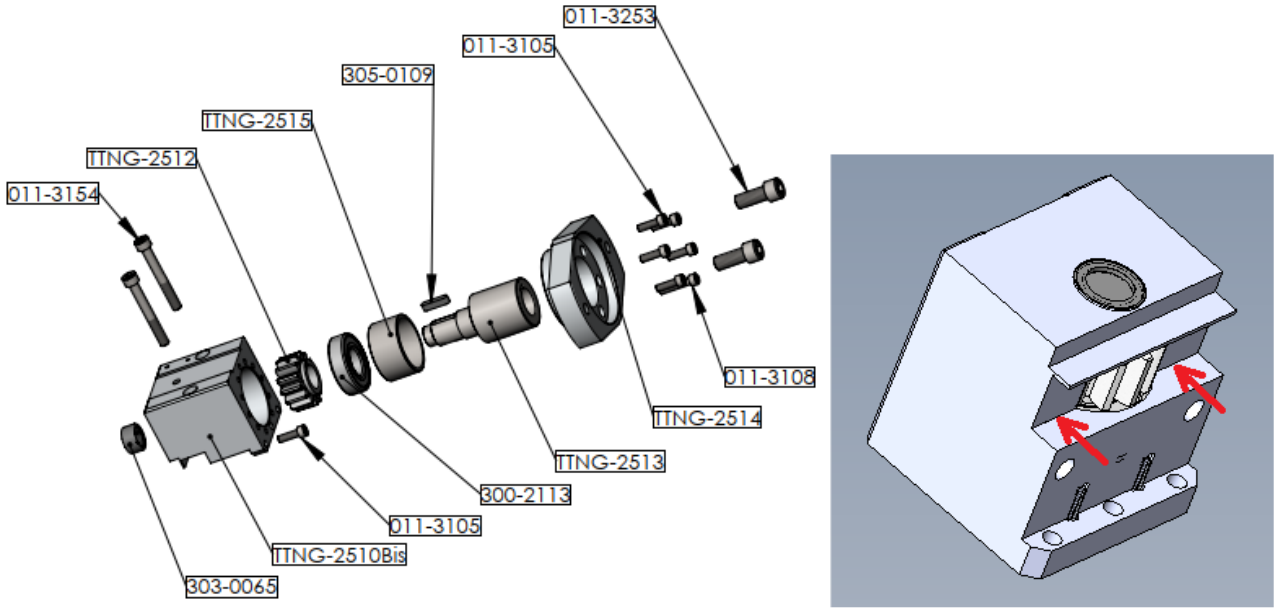
A.10.10 HYDRAULIC MOTOR BOX SUB-ASSEMBLY TTNG 762 TO TTNG 1016



TTNG-2506EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw		7
011-3108	Vis	Screw		1
011-3154	Vis	Screw		2
011-3253	Vis	Screw		2
300-2113	ROULEMENT A BILLES AVEC FLASQUES	BALL-BEARING WITH FLANGES		1
303-0065	DOUILLE A AIGUILLES	NEEDLE BEARING		1
305-0109	CLAVETTE-A-ACIER	STEEL KEY		1
TTNG-2510Bis	CORPS DE MOTORISATION TTNG-762 à 1016	TTNG-762 to 1016 DRIVE UNIT BODY		1
TTNG-2512	PIGNON MOTEUR 14 Dents	14-tooth – MOTOR GEAR		1
TTNG-2513	AXE MOTEUR HYDRAULIQUE	HYDRAULIC MOTOR SHAFT		1
TTNG-2514	CLOCHE ACCOUPLEMENT MOTEUR HYDRAULIQUE	HYDRAULIC MOTOR COUPLING HOUSING		1
TTNG-2515	ENTRETOISE	SPACER		1

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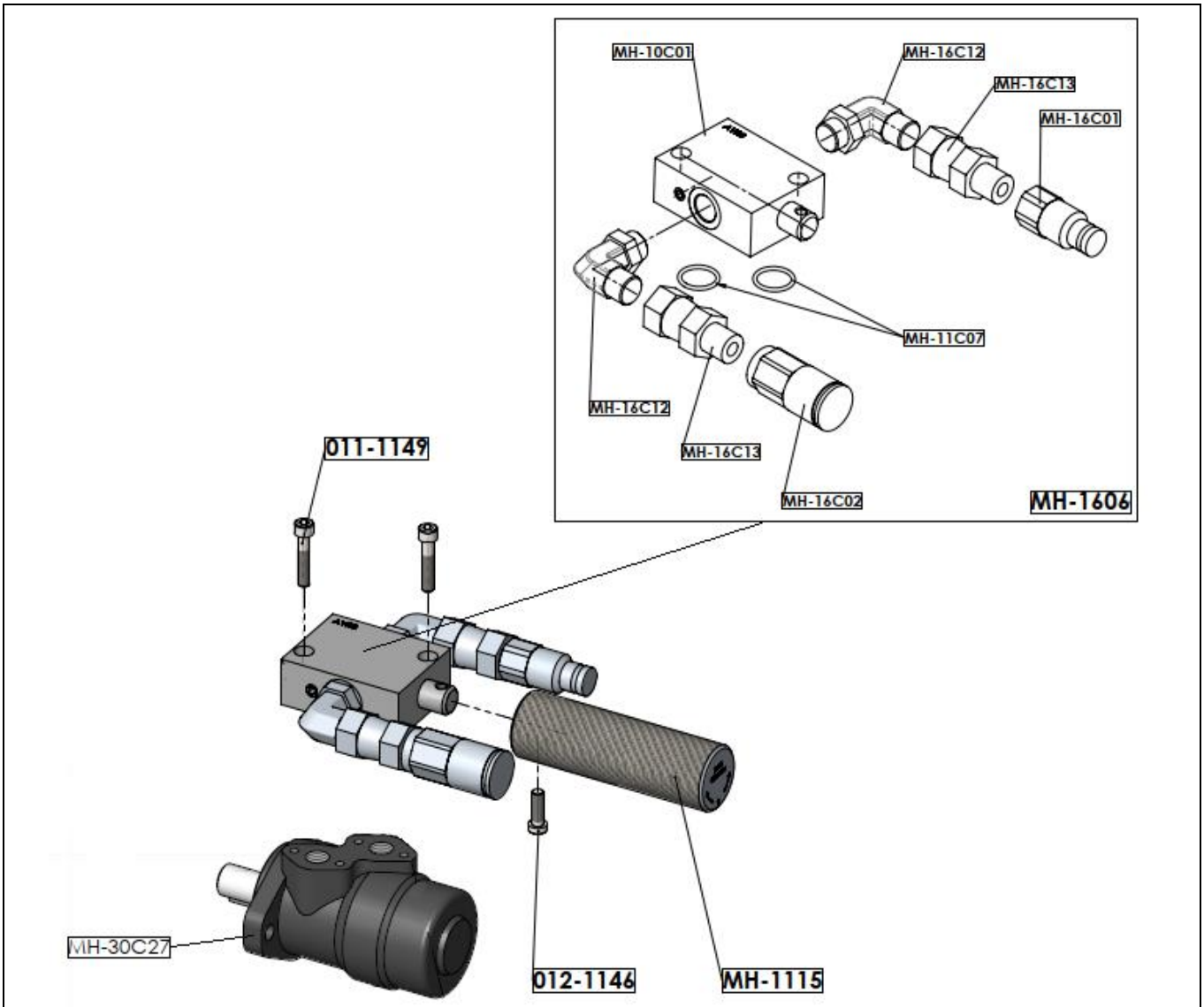
A.10.11 HYDRAULIC MOTOR SINGLE CONNECTION SUB-ASSEMBLY TTNG 168 TO TTNG 323



MH-1100EC / MH-30C27 / MH-1606

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-1149	Vis	Screw		2
012-1146	Vis	Screw		1
MH-1115	POIGNEE DE REGLAGE RALLONGEE	EXTENSION ADJUSTMENT KNOB		1
MH-30C27	MOTEUR HYDRAULIQUE	HYDRAULIC MOTOR		1
MH-1606	DISTRIBUTEUR COMPLET AVEC RACCORDS + JOINTS	COMPLETE DISTRIBUTOR WITH CONNECTIONS + GASKETS		1
MH-10C01	DISTRIBUTEUR LEVIER	DISTRIBUTOR LEVER		1
MH-11C07	JOINT TORIQUE	O RING		2
MH-16C01	COUPLEUR	MALE COUPLING		1

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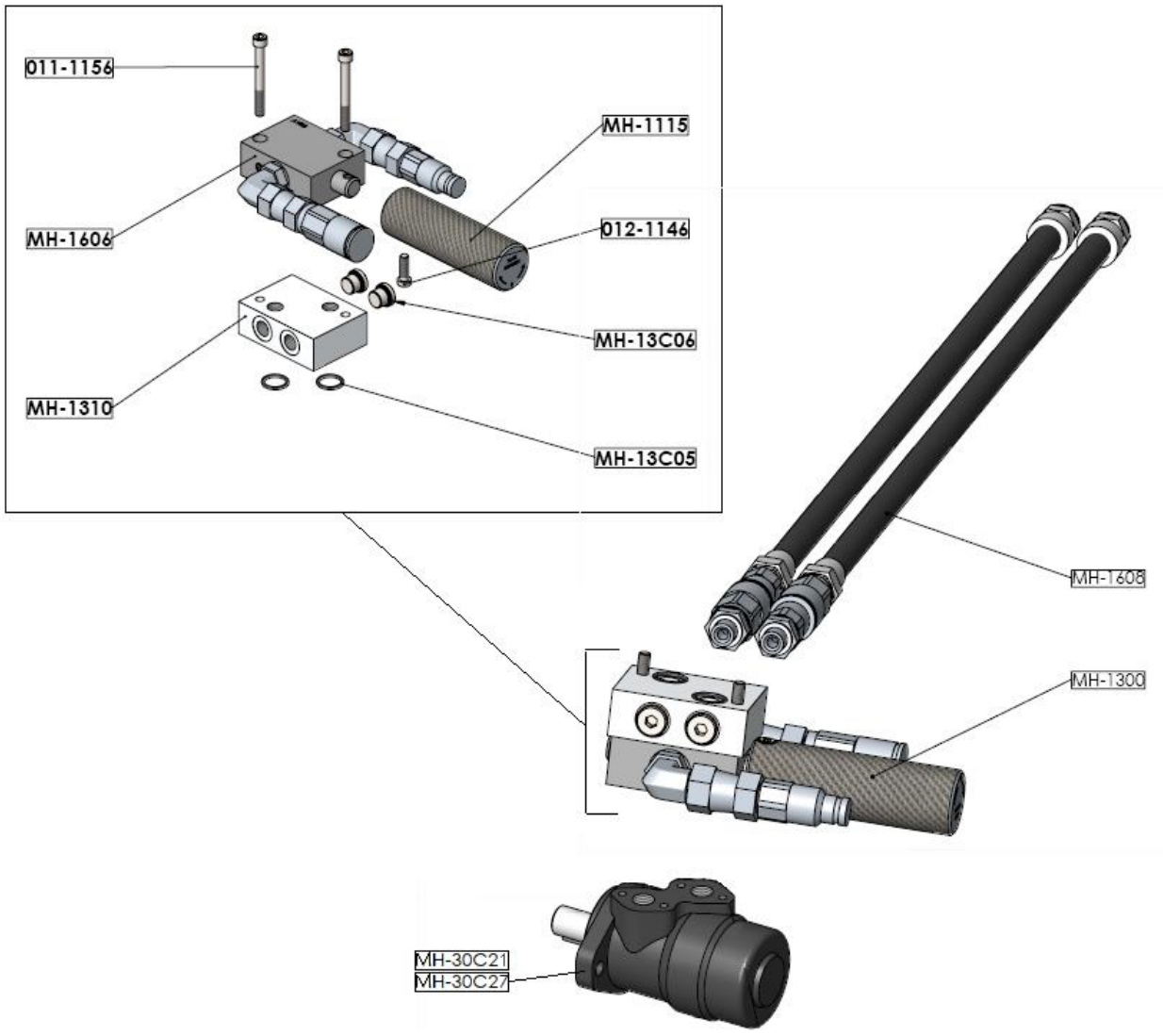
MH-16C02	COUPLEUR CFP-F3/8"-G1/2	MALE CFP-M3/8"-G1/2 COUPLING		1
MH-16C12	COUDE ORIENTABLE-90°	SWIVELING 90° ELBOW		2
MH-16C13	UNION ORIENTABLE G1/2	G1/2 SWIVEL JOINT		2

A.10.12 HYDRAULIC MOTOR DOUBLE CONNECTION SUB-ASSEMBLY TTNG 406 TO TTNG 1016



MH-1300EC / MH-30C21 / MH-30C27 / MH-1608

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
MH-1608	RACCORDEMENT-2xFLEXIBLES	CONNECTION-2xHOSES		1
MH-30C21 (1*)	**MOTEUR HYDRAULQIUE 100cm3 (TTNG406 à 762)**	100cm3 HYDRAULIC MOTOR (TTNG406 to 762)		**2**

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MH-30C27 (2*)	**MOTEUR HYDRAULQIUE 200cm3 (TTNG900 à 1016)**	200cm3 HYDRAULIC MOTOR (TTNG900 to 1016)		**2**
MH-1300	DISTRIBUTEUR COMPLET AVEC RACCORDS + JOINTS	COMPLETE DISTRIBUTOR WITH CONNECTIONS + GASKETS		1
011-1156	Vis	Screw		2
012-1146	Vis	Screw		1
MH-1115	POIGNEE DE REGLAGE RALLONGEE	EXTENSION ADJUSTMENT KNOB		1
MH-1310	CORPS POUR DOUBLE MOTORISATION	BODY FOR DOUBLE DRIVE		1
MH-13C05	JOINT TORIQUE	O RING		2
MH-13C06	BOUCHON 6 PANS CREUX	FEMALE ALLEN KEY PLUG		2
MH-1606	DISTRIBUTEUR	DISTRIBUTOR		1

(1*) : For TTNG 406 to 762
(2*) : For TTNG 900 to 1016

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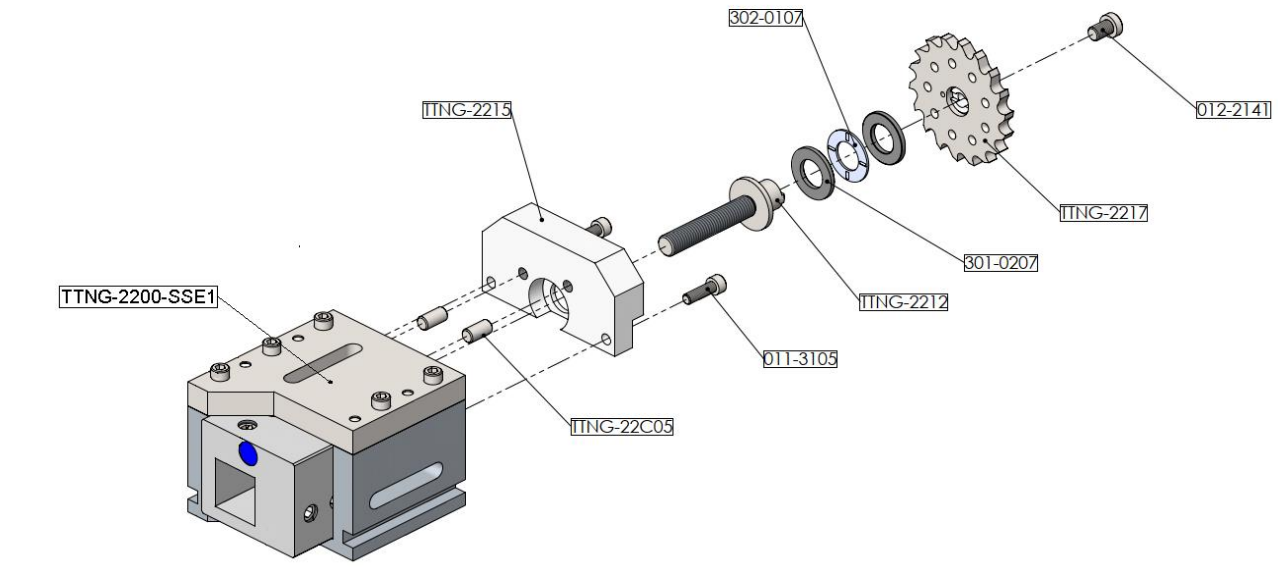
A.10.13 *50 MM TRAVERSE TOOL-HOLDER CARRIAGE (TTNG 168 TO TTNG 508)*



TTNG-2200EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw		2
012-2141	Vis	Screw		1
301-0207	RONDELLE MINCE	THIN WASHER		2
302-0107	BUTEE A AIGUILLES	NEEDLE THRUST BEARING		1
TTNG-2200-SSE1	SOUS ENSEMBLE CORPS DE CHARIOT	CARRIAGE BODY SUB-ASSEMBLY		1
TTNG-2212	VIS D'AVANCE	FEED SCREW		1
TTNG-2215	CACHE DE PROTECTION	PROTECTIVE HOUSING		1
TTNG-2217	ROUE DENTEE+ENTRETOISE	GEAR + SPACER		1
TTNG-22C05	VIS POUSSOIR	PIN SCREW		2

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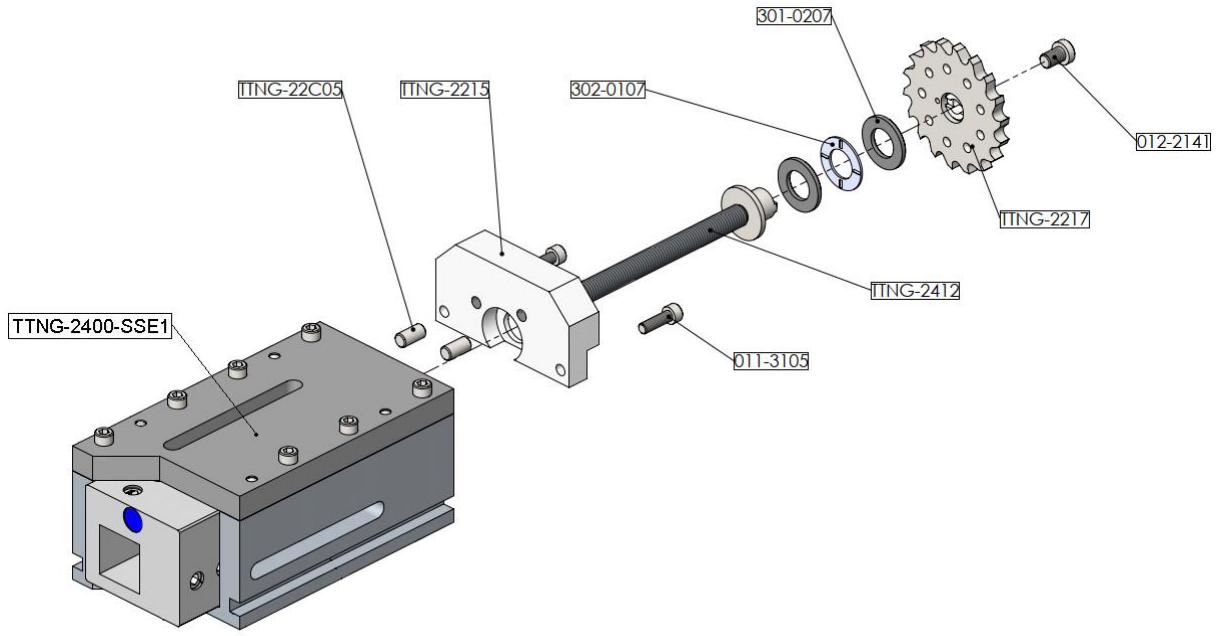
A.10.14 100 MM TRAVERSE TOOL-HOLDER CARRIAGE (TTNG 610 TO TTNG 1016)



TTNG-2400EC

Ref. Cde / Order Nr.	Désignation	Description	Bezeichnung	Qty
011-3105	Vis	Screw		2
012-2141	Vis	Screw		1
301-0207	RONDELLE MINCE	THIN WASHER		2
302-0107	BUTEE A AIGUILLES	NEEDLE THRUST BEARING		1
TTNG-2400-SSE1	SOUS ENSEMBLE CORPS DE CHARIOT	CARRIAGE BODY SUB-ASSEMBLY		1
TTNG-2412	VIS D'AVANCE	FEED SCREW		1
TTNG-2215	CACHE DE PROTECTION	PROTECTIVE HOUSING		1
TTNG-2217	ROUE DENTEE+ENTRETOISE	GEAR + SPACER		1
TTNG-22C05	VIS POUSSOIR	PUSH SCREW		2

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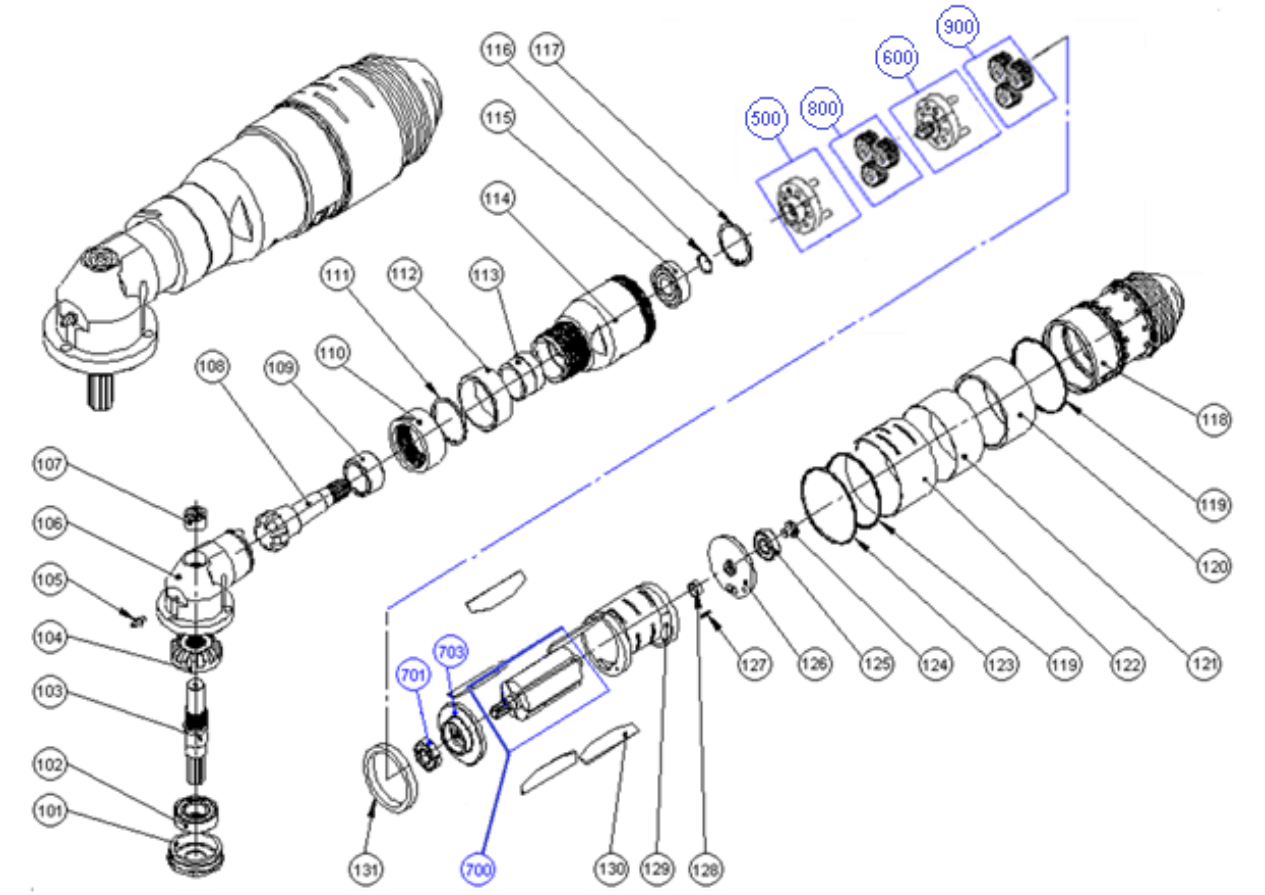
A.11 Exploded view and parts list - motor

A.11.1 AIR MOTOR DRIVE UNIT 01/21



MO20 + RA20 R=9/12				TTNG	
Right angled drive / renvoi d'angle / Winkelantrieb					
N°	**Description:**	**Désignation:**	**Beschreibung**	**Qty.:**	**Reference**
101	Bearing cap	Chapeau de roulement	Abdeckung	1	**RA20-06**
102	Bearing ball	Roulement à billes	Kugellager	1	**RA20-Co03**
103	Output shaft	Axe de sortie	Ausgangsachse	1	**RA20-04**
104	Cog wheel	Couronne	Kegelzahnrad	1	**RA20-03**
105	Greaser	Graisseur droit	Schmiernippel	1	**RA20-CO06**
106	Right angle body	Corps de renvoi d'angle	Gehäuse	1	**RA20-02**
107	Joint needle bearing	Douille à aiguilles avec fond	Nadellager	1	**RA20-Co01**
108	Output shaft	Pignon arbré	Ritzel	1	**RA20-05**
109	Needle bearing	Douille à aiguilles sans fond	Nadellager	1	**RA20-Co02**
110	Nut	Ecrou pour renvoi d'angle	Mutter	1	**RA20-07**
111	Half shell	Demi lune	Halbring	2	**RA20-09**
112	Spacer	Entretoise extérieure	Distanzring	1	**RA20-08**
113	Inside spacer	Entretoise intérieure	Distanzring	1	**RA20-10**

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Pneumatic drive / Ensemble pneumatique / Pneumatikantrieb					
114	Two level reduction body	Carter de réduction deux étages	Gehäuse (2-stufig)	1	**MO20-10**
115	Bearing ball	Roulement à billes	Kugellager	1	**MO10-CO01**
116	Circlip	Circlips extérieur	Sicherungsring	1	**MO10-CO09**
117	Circlip	Circlips intérieur	Sicherungsring	1	**MO10-CO11**
118	Rear body	Carter pneumatique	Hinteres Gehäuse	1	**MO20-11**
119	O-ring	Joint torique	O-Ring	2	**MO20-CO08**
120	Felt	Feutre de silencieux	Filz	1	**MO10-35**
121	Sieve	Tamis pour silencieux	Sieb	1	**MO10-36**
122	Silencer body	Corps de silencieux	Schalldämpfergehäuse	1	**MO20-26**
123	O-ring	Joint torique	O-Ring	1	**MO20-CO14**
124	Round headed bolt	Vis tête bombée à embase	ULF-Schraube	1	**MO20-CO06**
125	Bearing ball	Roulement à billes	Kugellager	1	**MO20-CO02**
126	Rear shield (right rotation)	Flasque rotation à droite	Hinterflansch (Rotation rechts)	1	**MO20-12**
127	Elastic pin	Goupille mécanindus	Stift	1	**MO10-CO13**
128	Washer	Entretoise	Zwischenstück	1	**MO20-20**
129	Stator	Stator	Stator	1	**MO20-14**
130	Jaw	Palette	Rotorlamellen	5	**MO20-16**
131	Bolster	Cale	Scheibe	1	**MO20-18**
Front planetary gear train / Ensemble Planétaire avant / Vorderer Planetengetriebezug					
500	Subassembly front planetary gear	Sous-ensemble train planétaire avant+3 goupilles Co17 montées pour pignon 12dts	Baugruppe: Vorderer Planetengetriebezug mit 3x stift für Ritzel 12 Zähne	1	**MO20-22-3-SSE2**
Rear planetary gear train / Ensemble Planétaire arrière / Hinterer Planetengetriebezug					
600	Subassembly rear planetary gear	Sous-ensemble train planétaire arrière+rondelle Co21+pignon 12dts+3 goupilles Co17 montées pour pignon 9dts	Baugruppe: Hinterer Planetengetriebezug mit Schreibe MO10-Co21, Ritzel 12 Zähne + 3x stift für Ritzel 9 Zähne	1	**MO20-19-3-12-SSE1**
Rotor Assembly / Ensemble Rotor / Baugruppe Rotor					
700	Sub assembly Rotor	Sous-ensemble rotor+pignon 9dts	Baugruppe Rotor mit Ritzel 9 Zähne	1	**MO20-15-9-SSE1**
701	Bearing ball	Roulement à billes	Rotor	1	**MO20-CO02**
703	End shield	Flasque avant	Vorderflansch	1	**MO20-13**
Sub assembly satellite / Sous-ensemble satellite / Baugruppe Satellit					
800	21 tooth satellite sub-assembly with needle sleeve	Sous-ensemble satellite 21dts avec douille à aiguilles	21-Zahn-Satelliten-Baugruppe mit Nadelhülse	3	**MO20-21-4-SSE1**
Sub assembly satellite / Sous-ensemble satellite / Baugruppe Satellit					
900	23 tooth satellite sub-assembly with needle sleeve	Sous-ensemble satellite 23dts+douille à aiguilles	23-Zahn-Satelliten-Baugruppe mit Nadelhülse	3	**MO20-21-3-SSE1**

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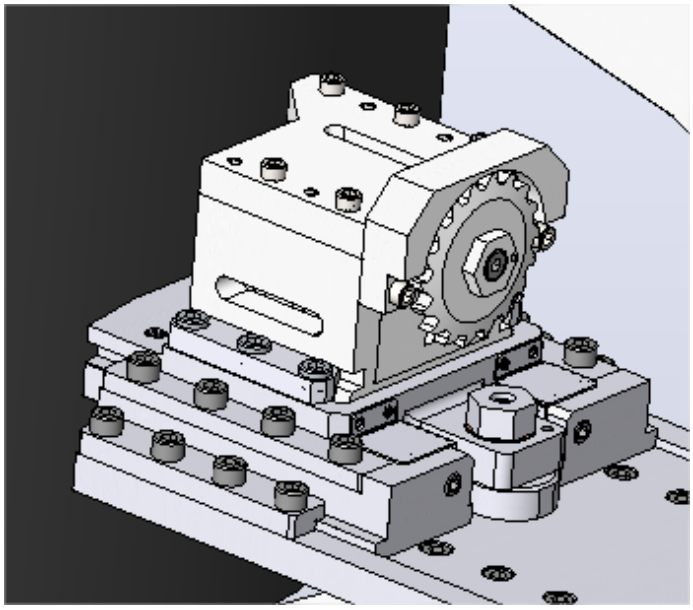
A.12 Extra equipment and options

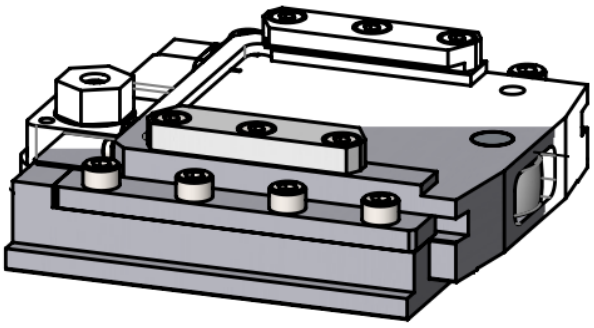
A.12.1 OUT-OF-ROUNDNESS TRACKING



DESCRIPTION

With this option, a bevel can be made by tracking the outside profile of the pipe and therefore taking account of any possible out-of-roundness.

- Out-of-roundness tracking capacity = +/- 10mm (0.394'')
- Pipe wall thickness: 25mm max (0.984'')
- Machining traverse = 50mm (1.97'')



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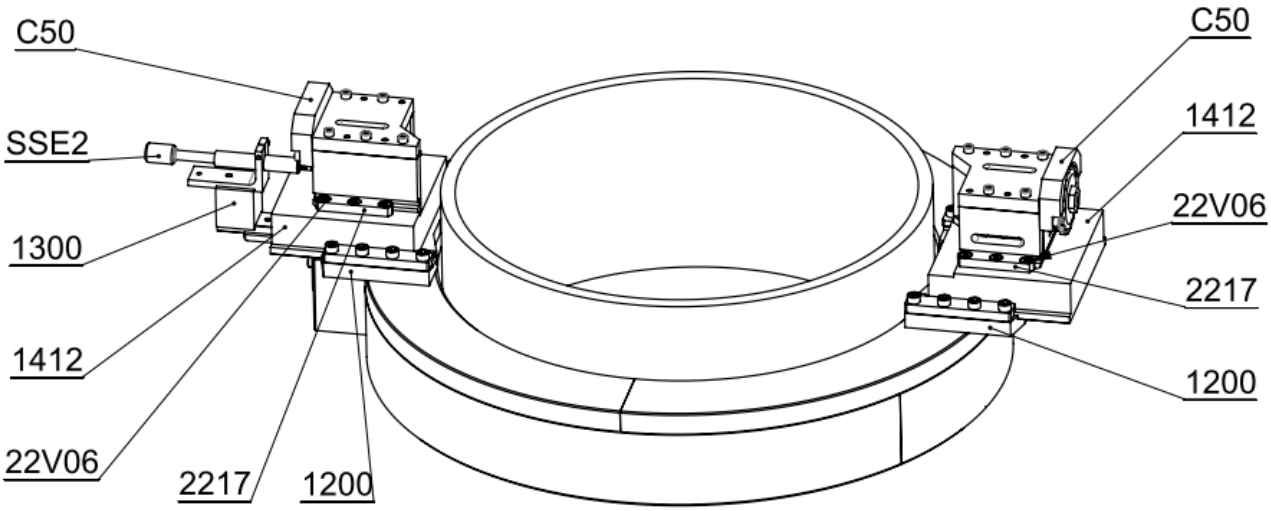
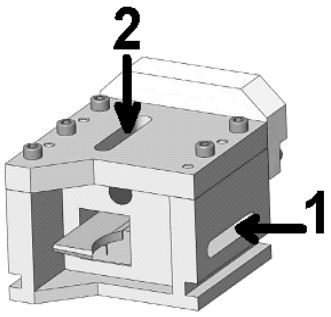
CUTTING OPERATIONS

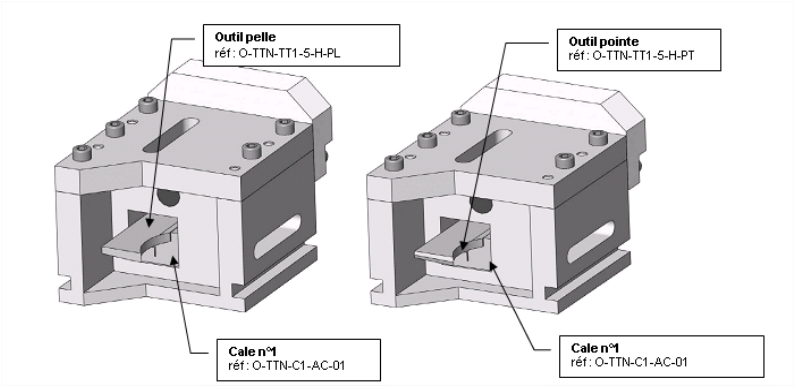


- Install the TTNG (See TTNG § operating manual).
- Fit one carriage with a square-head severing tool and another carriage with a pointed tool.
- ***Positioning the tools:***

Note: Use a 6 mm Allen key for fixing tools in position and comply with the following method for tightening them in place:



a. Positioning the tool + shim assembly in the tool-holder as per the selected machining configuration.
b. Tighten the three screws n°1 (firmly in contact, but not fully tightened)
c. Tighten the three screws n°2 (firmly in contact, but not fully tightened)
d. Fully tighten the three N° 1 screws
e. Fully tighten the three N°2 screws



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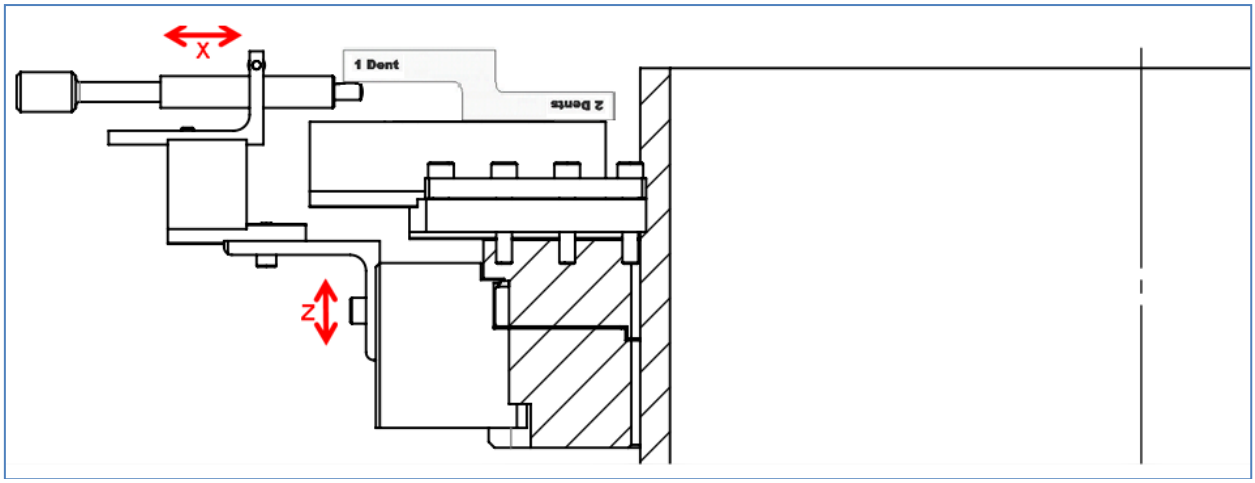
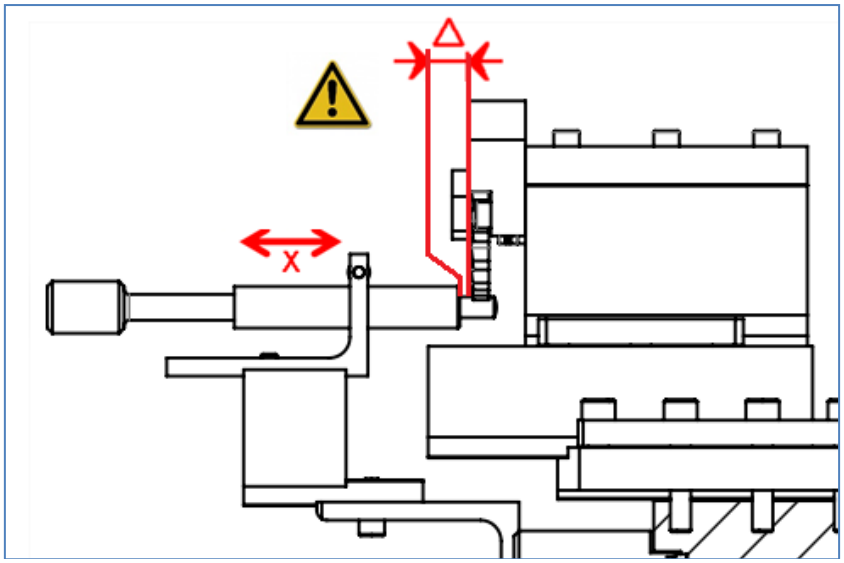
- Mount the two plates, item 1200, on the machine crown-wheel.
- Adjust the position of the riser blocks, item 1412, depending on the machining operation to be carried out, and attach them to the plates using the 4 clamping bars.
- Mount the two carriages with a 50 mm (1.97”) traverse on their riser blocks, item 1412, using the 4 holding bars.
- Install the special clutch unit, item 1300, and adjust the position of the clutch finger.
- ***Positioning the clutch finger***

  Use the shim supplied for adjusting the increment movement and proceed as follows:





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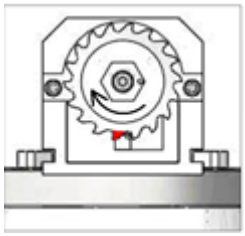
1/ Move the clutch finger close to the carriage for adjusting depth X. Keep sufficient clearance Δ between the star wheel and the fixed part of the clutch finger.

2/ Check that the incremental movement of the gear wheel is correct in relation to the clutch finger (1 or 2 teeth) for adjusting height Z.

To do this:

- Mark one of the teeth (in red for example),
- Note the position of the mark,
- Start turning the machine at low speed, either 9 or 18 RPM depending on the incrementation.
- Stop turning,
- Check that the mark has come back to position “0”
- If its position is not correct, re-adjust the clutch finger.



Note: For cutting the smallest pipes in the range, the clutch finger support can be turned over, which enables the tool carriage to be brought nearer to the pipe.

- ***Machining***

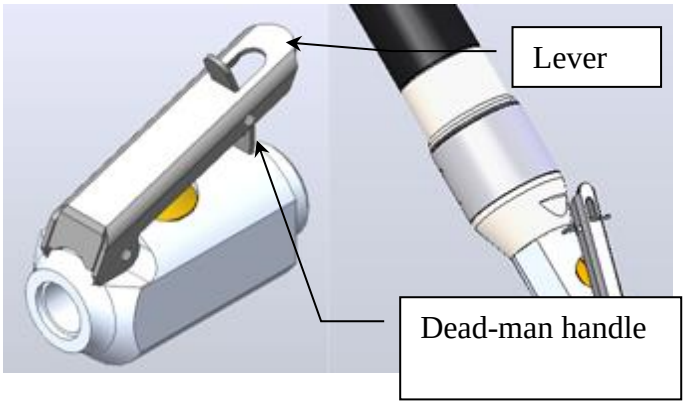
- Connect the machine to the power supply.

- Check that the following elements are mounted and held in position correctly:
  - The tools in the tool-holders
  - The tool carriages on the tool plate.
  - The machine on the pipe.

- The tools will start rotating by using:
  - For an air motor, the “dead-man” handle fitted on the end of the manifold.

Reminder:

The dead-man handle is a safety element. It prevents the operator from starting the spindle accidentally. To start the air-motor(s), unlock the safety trigger and press on the lever. This device may not be used for any other application nor be removed and replaced by a different feed device.



  - For a hydraulic motor: By pressing the start/stop button and by turning the knurled speed adjustment knob to find the best possible machining speed.

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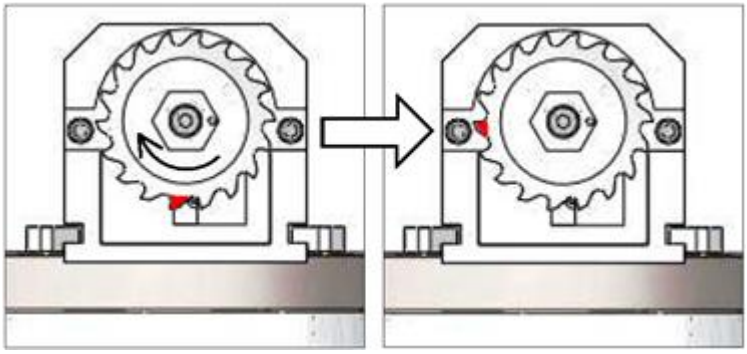
Direction reversing valve:

The direction reversing valve can be used for reversing the machine's direction of rotation whenever necessary (for instance, should a tool break or jam in the material being machined). It must not be used for adjusting speed under any circumstances whatsoever. Never leave the valve in an intermediate position. Always use the valve in one of its four positions:
- Machining rotation position
- 2x stop positions (0)
- One reverse position (for withdrawing tools)

Warning: Do the first turn at low speed to avoid breaking tools should the unit not have been tightened into position concentrically.

- Set the position of the tools in relation to the pipe:
  - Firstly, bring the pointed tool into position against the pipe until it starts cutting the groove.
  - Secondly, bring the square-nosed severing tool into position against the pipe until it starts cutting the throat on the initial groove.
  - Stop turning
  - Using a flat 24 mm spanner, move the gear wheel (clockwise) on the square-nosed tool carriage backward by about 4 teeth or 0.3 mm (this value may vary depending on machining specifications).



  - You will then obtain the following machining configuration.

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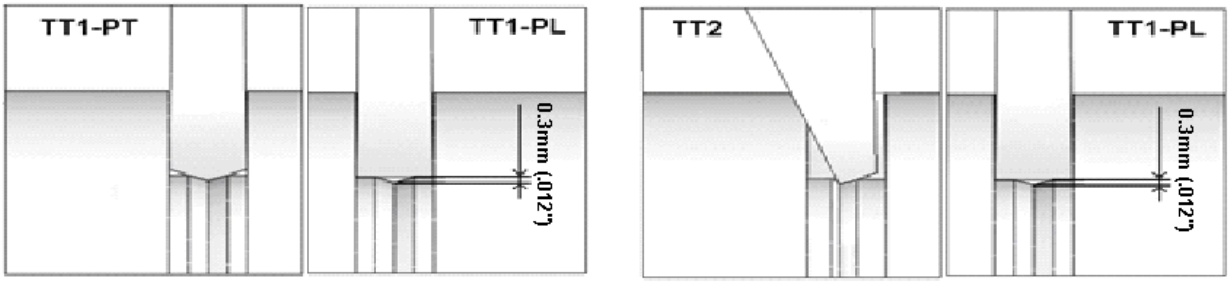

- Restart machining, checking that the carriages feed forward at a constant speed.

Warning: If you wish to remove chips whilst cutting, you must stop the machine from turning and use gloves with an extremely thick inside protection. Wearing gloves does not mean that the operator can remove chips with his hands. Suitable apparatus or a chip hook must be used. Removing chips with your hands is strictly prohibited.

NB: Before stopping the machine, declutch the clutch finger and let the machine make about three turns so that tool-bits are completely free of any chips.

Note: If the machine appears to be labouring when cutting, disengage the clutch and re-engage it when rotation has returned to normal.
If this anomaly persists, check the tool cutting edges.

NB: Check that no chip gets wedged between the tracking cam and the carriage.

- We recommend lubricating when cutting or cooling the tool with cutting oil, water, or compressed air.

- Once the cut has been finished, disengage the clutch finger and let the machine rotate for about three full turns, and then stop the machine.

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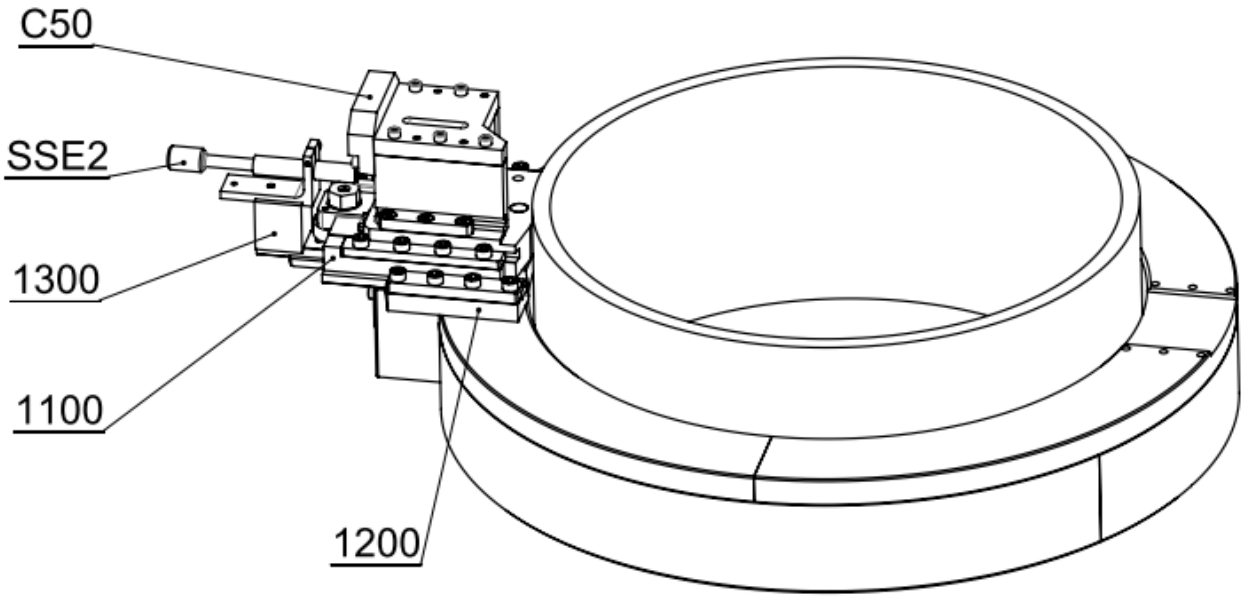
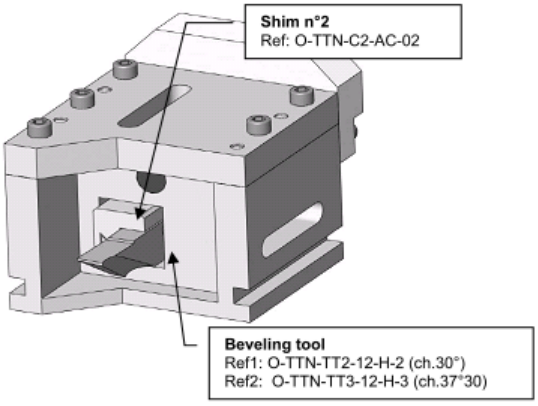
BEVELING WITH OUT-OF-ROUNDNESS TRACKING

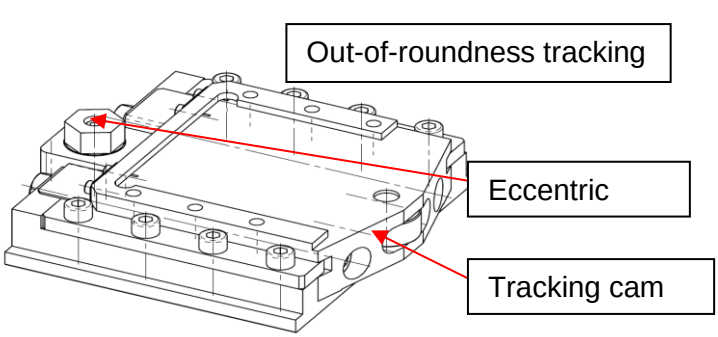


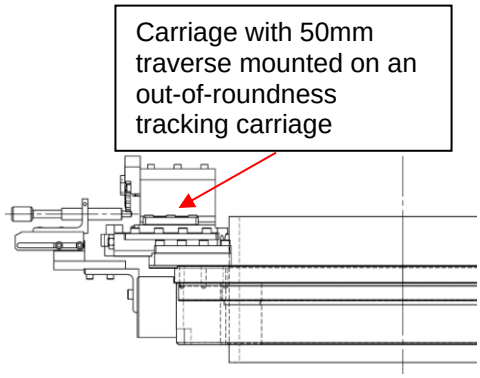
- Dismantle the two riser block assemblies, item 1412 + the 50 mm (1.97”) traverse carriages

- Fit one of the two 50mm (1.97’’) traverse carriages for a beveling tool.



- Fit this 50mm (1.97’’) traverse carriage onto the profile tracking carriage, item 1100, and hold in position with the clamping bars.





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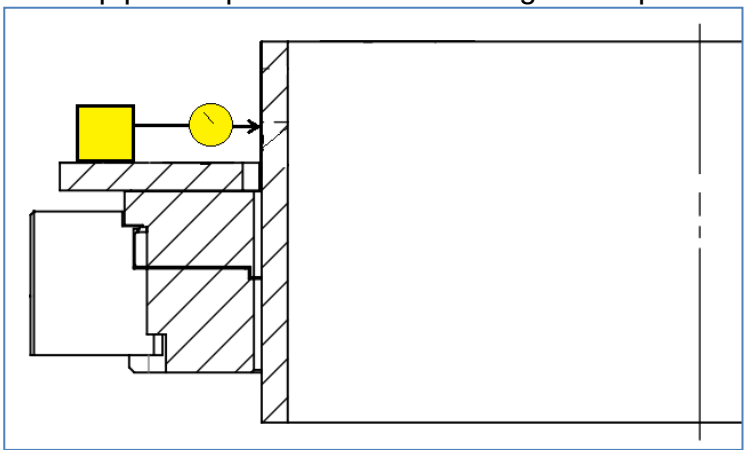
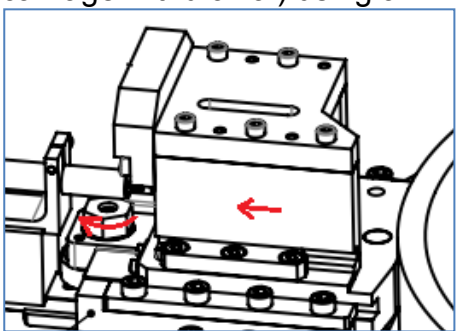
Warning: Knowing that the position of the carriage has changed, withdraw the clutch as far as possible before starting the rotation of the machine.
Check that the area on which the tracking roller will roll is clean, free of any uneven surfaces and chips. Brush or grind this area if necessary.

- Before attaching the tracking carriage to the machine, start the tool plate rotating at low speed and, using a dial indicator, determine the average out-of-roundness point on the pipe. Stop the unit from turning in this position.



- Place the complete unit, the profile tracking carriage + the 50 mm (1.97”) traverse carriage, on the base-plate without fixing it in position and move the eccentric (for carriage withdrawal) using a 24 mm (0.945”) wrench.



- When the eccentric is moved, the tracking carriage will be in a central position and will have a traverse distance of +10mm (+0.394’’) to –10mm (-0.394’’)

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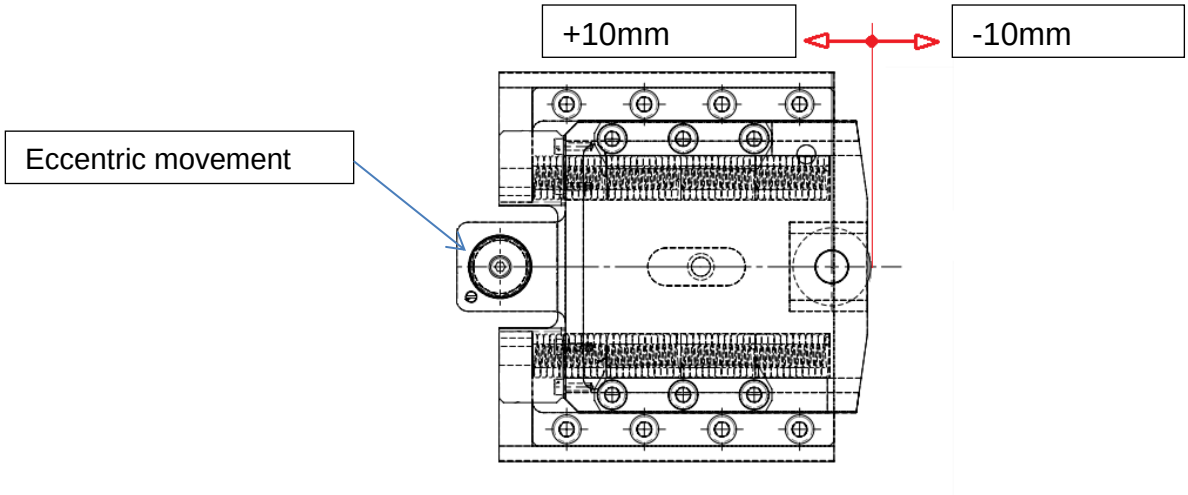
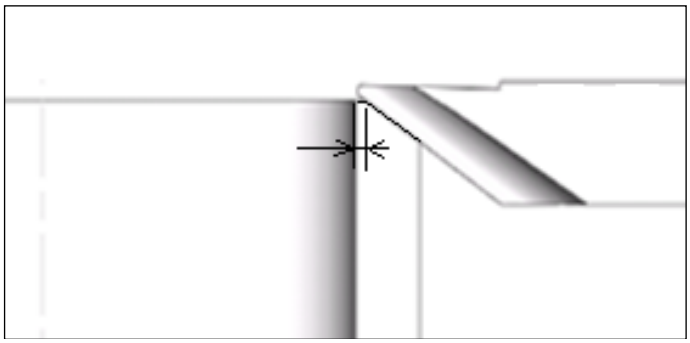


- Put the tracking cam against the pipe.
- Attach the tracking carriage to the base-plate using the 2 clamping bars and release the eccentric.
- Adjust the clutch as per the instructions given in the above paragraph.
- Bring the beveling tool into position a few mm from the pipe by turning the gear-wheel located at the back of the 50 mm (1.97”) traverse carriage.
- Carry out the machining operation as per the instructions given in the above paragraph.
- Stop the rotation movement when the required land width has been attained.



- Put the tool-holder carriages in the retracted position and remove any chips.
- Clean the machine.

NB: A cutting and beveling operation can be carried out at the same time by using two out-of-roundness tracking carriages (1 for the severing tool and the other for the beveling tool). To do this, the tool-setting instructions must be followed as described above.

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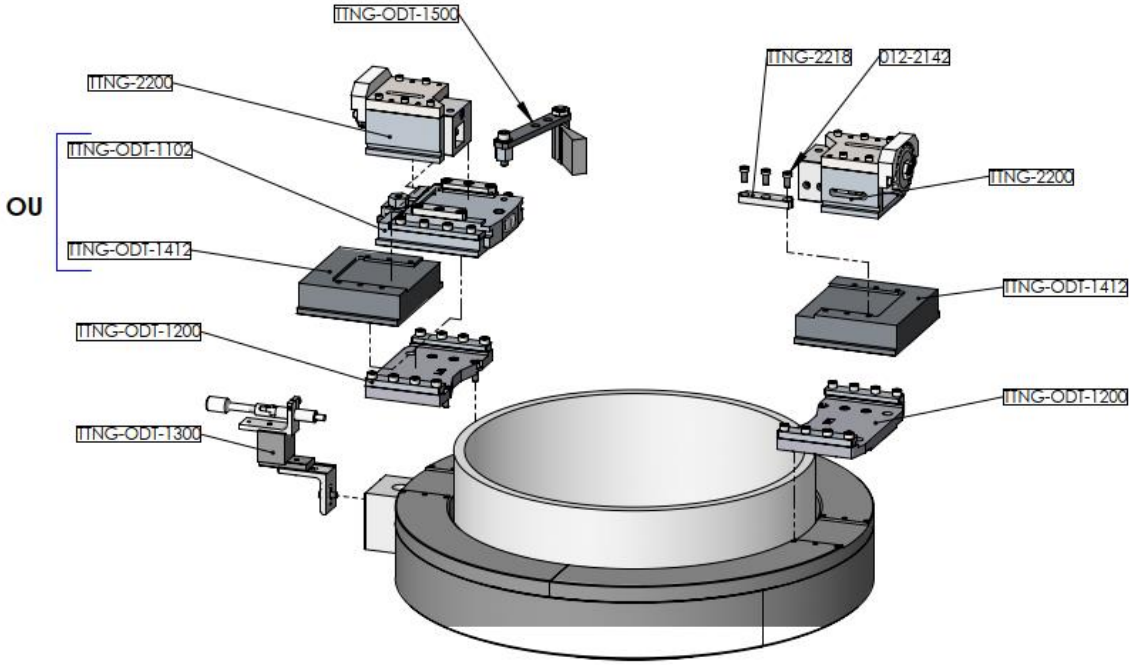
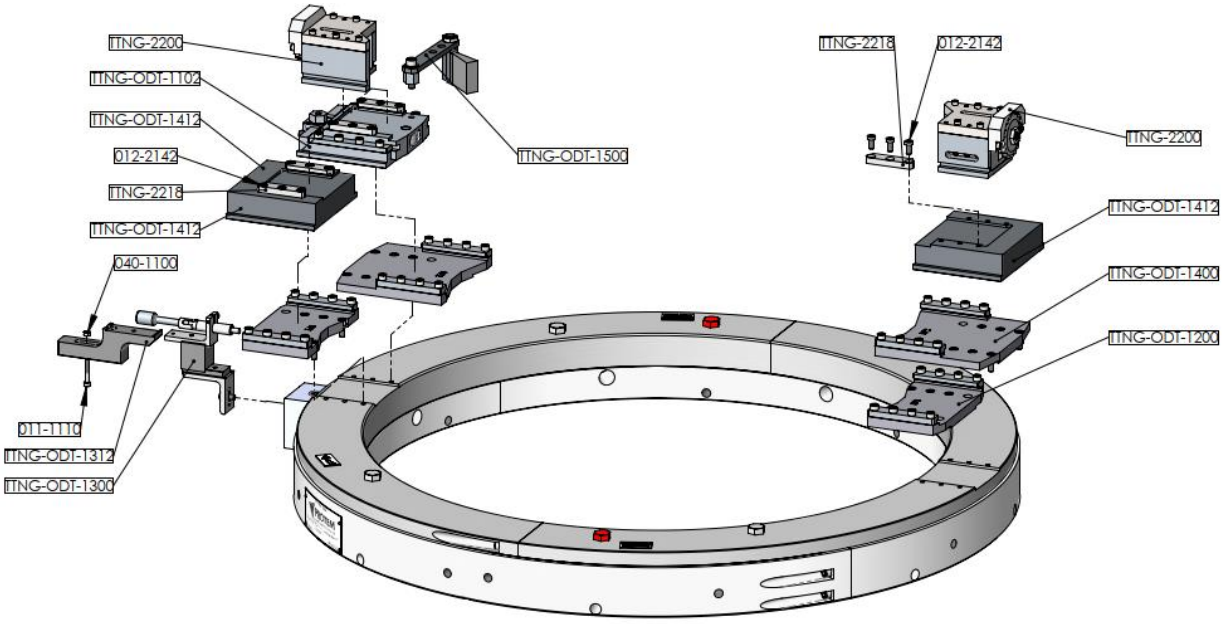
- **TTNG-ODT-1000 / 1002: Exploded views of 20m out-of-roundness tracking unit for TTNG 219 to TTNG 762**



- **TTNG-ODT-1004: Exploded views of 20m out-of-roundness tracking unit for TTNG 900 to TTNG 1016**



NB: *Assemble the TTNG-ODT-1200 or TTNG-ODT-1400 plates depending on the diameter of the pipe to be machined.*

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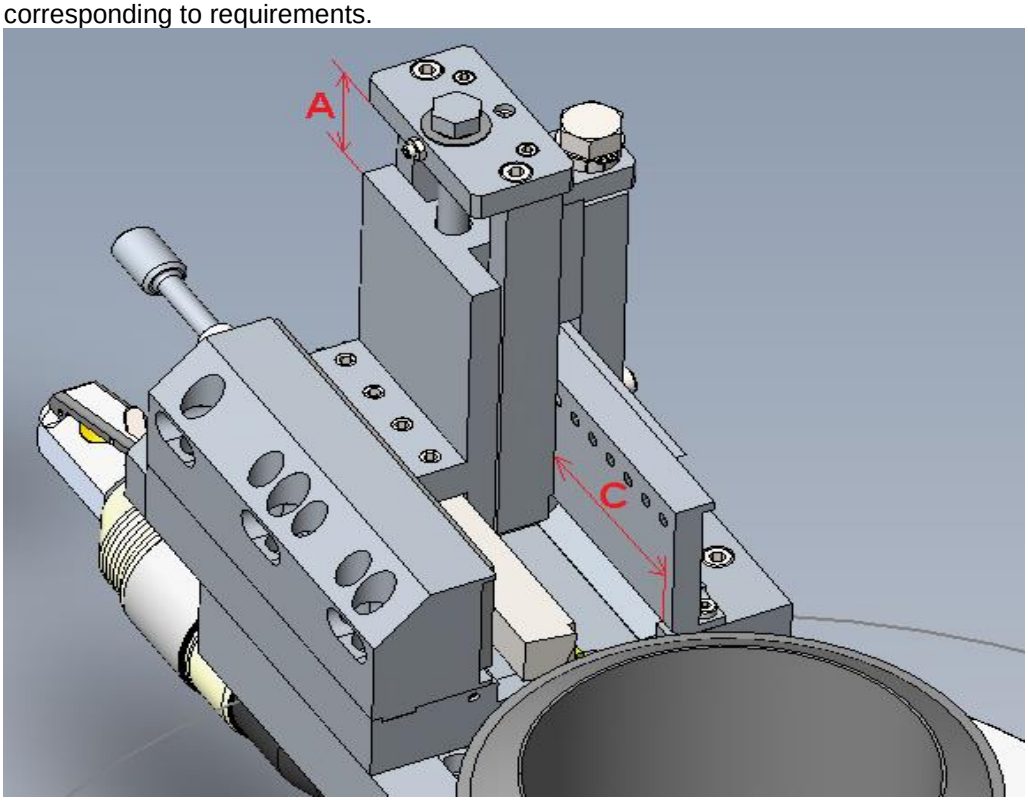
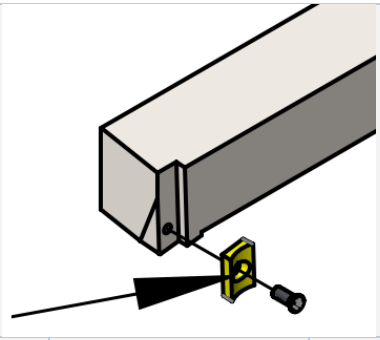
A.12.2 COPYING CARRIAGE (TRAVERSE 50MM / 100MM)

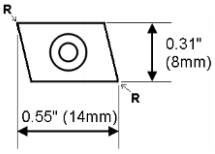
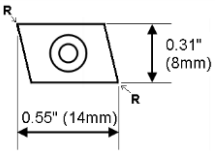
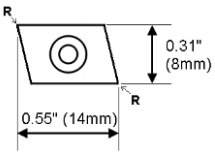
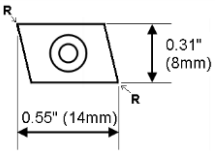
	A	C
Copying carriage unit, traverse 100mm / amplitude 50mm	50mm	100 mm
Copying carriage unit, traverse 50mm / amplitude 30mm	30mm	50mm

A = Amplitude needing to be defined depending on the height of the bevel required.
C = traverse needed depending on the thickness of the bevel required.

Warning: The traverses given above are the maximum mechanical traverses. These movements do not correspond to the maximum capacities of the bevels to be made. Depending on the size of the bevel to be made, PROTEM's commercial department must be contacted for defining the right material corresponding to requirements.





Description	Order reference nb	Diagram	Treatment color
HSS TiN 2xR0.2 insert	TTNG-4251		Gold
HSS TiN 2xR1.6 insert	TTNG-4252		Gold
TiN 2xR0.2 CARBIDE insert	TTNG-4253		Gold
HSS TiN 2xR0.5 insert	TTNG-4254		Gold

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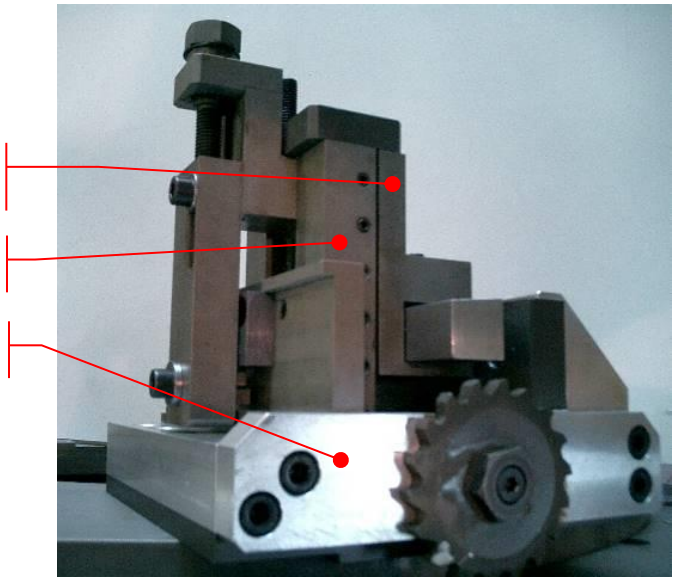
Using the copying carriage (carriage with a 100mm traverse shown):

As using the copying carriage is a relatively complex operation, we strongly recommend that tooling is used by two persons named and trained in its use.

- **Description of the copying carriage:**

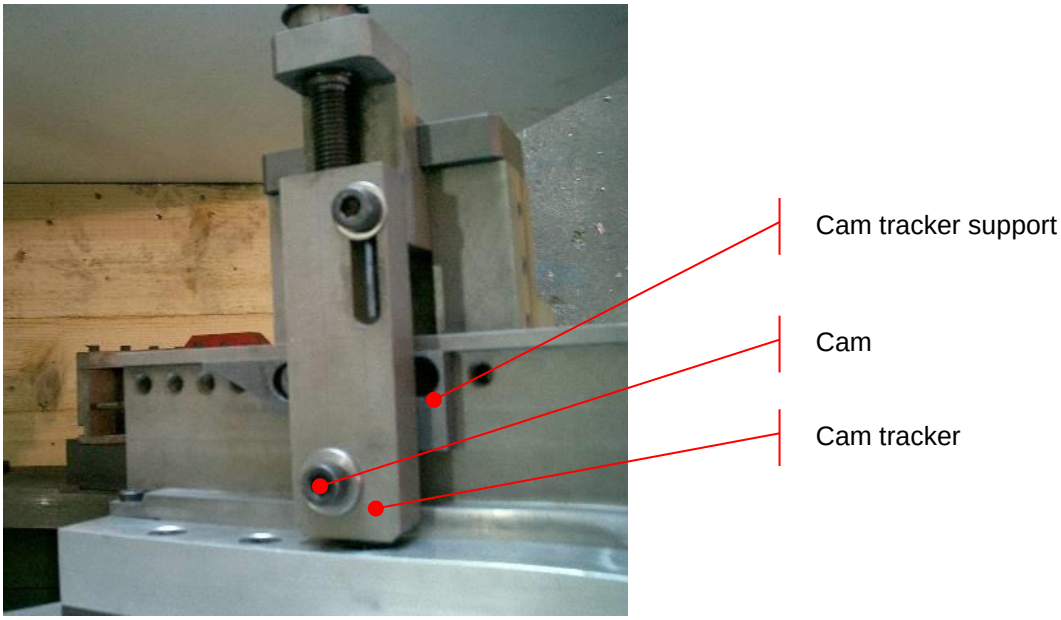
The copying carriage is comprised of:

- A holder carriage:
- A feed carriage
- A tracking carriage.



- **Tracking is done with:**

- 1 cam
- 1 cam tracker mounted on its support bracket



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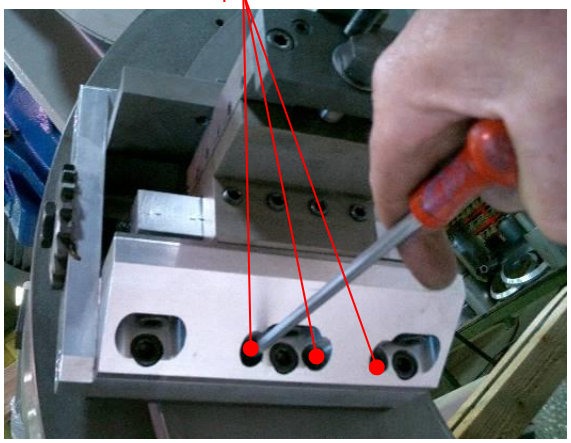
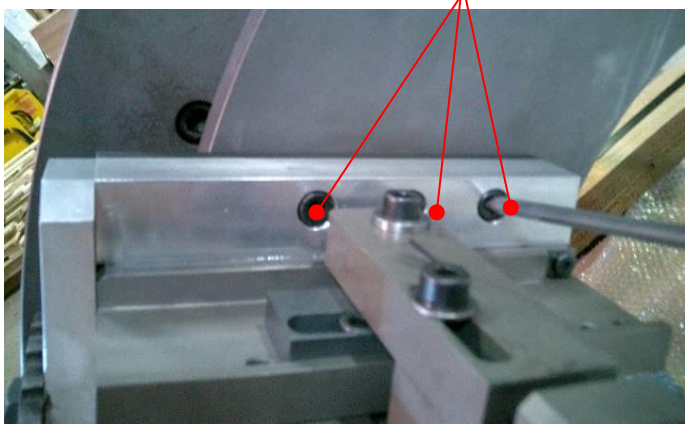
- **Installing the copying carriage:**

  - Fit the intermediate plate in position on the machine tool plate.
  - Fit the copying carriage onto the machine tool plate with 2x3 flat-head screws.

3 screws on the tool side



3 screws on the cam side

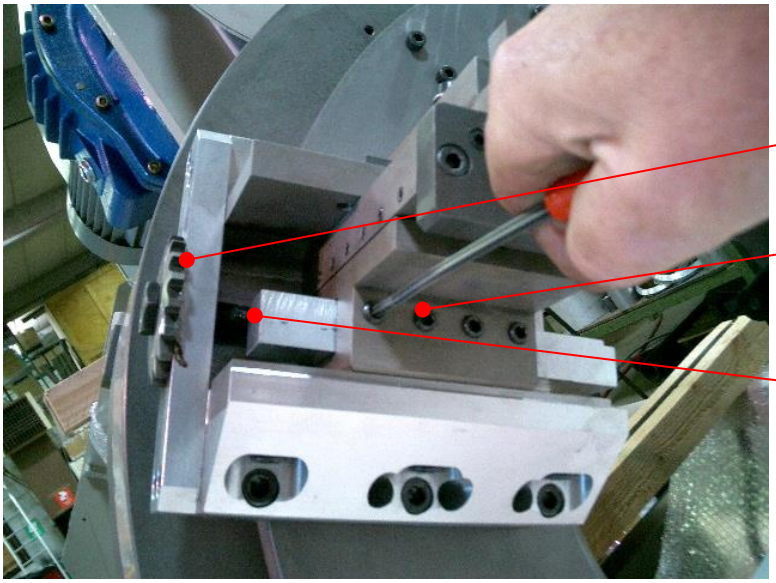


- **Fitting the tool block:**

  - Fit the tool block onto the carriage.

Warning: The distance between the back of the tool block and the star wheel must be sufficient for withdrawing the tool

  - Tighten the tool block with the four screws referred to above.



Gear wheel

4 Insert-block clamping screws

Rear face of the insert-block

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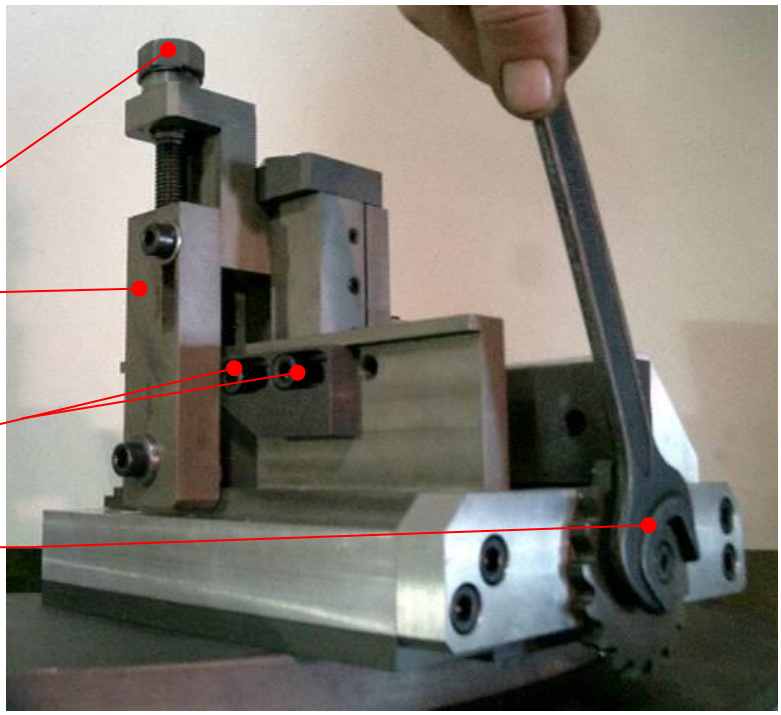
- **Cam adjustment**


Hexagon knob
Cam tracker support screw
Cam screw
24mm hex key on the feed wheel for moving the carriage backward and forward manually.

- Loosen the cam screw as well as the tracker cam support screw.
- Withdraw the indexing finger from the cam by turning the hex knob.
- Back off the feed carriage manually so that the insert cutting edge is flush with the pipe ID (once counterboring has been finished). See diagram 1.
- Once this adjustment has been made, retract the insert by a distance equal to the width of land required (A). See diagram 2.

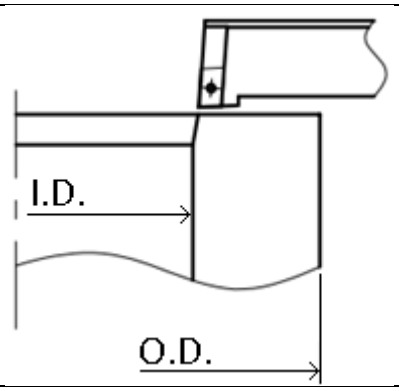


Diagram N° 1

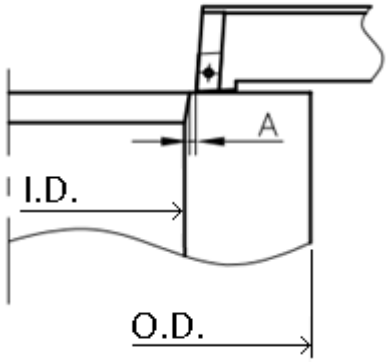


Diagram N° 2

- On the cam, this position corresponds to the beginning of the pipe section to be faced. See diagrams 3 & 4.

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Machining direction

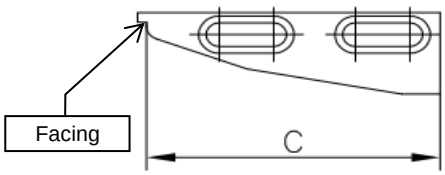

Diagram N° 3

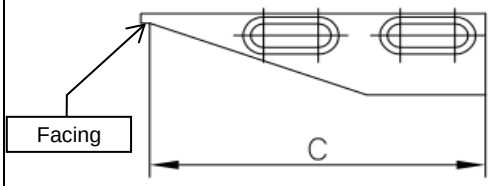

Diagram N° 4

- Position the cam on the indexing finger as shown in diagrams 5 and 6.
- To position the cam easily and accurately, the following simple calculation is required:
- Dimension D (easy to set accurately) = C (diagrams 3 and 4) – B.
- B being the position of the indexing finger in relation to its support bracket =21mm.

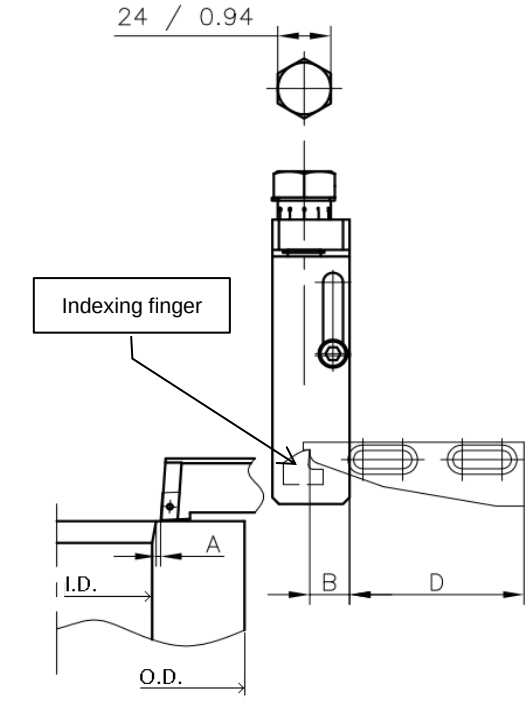

Diagram N° 5

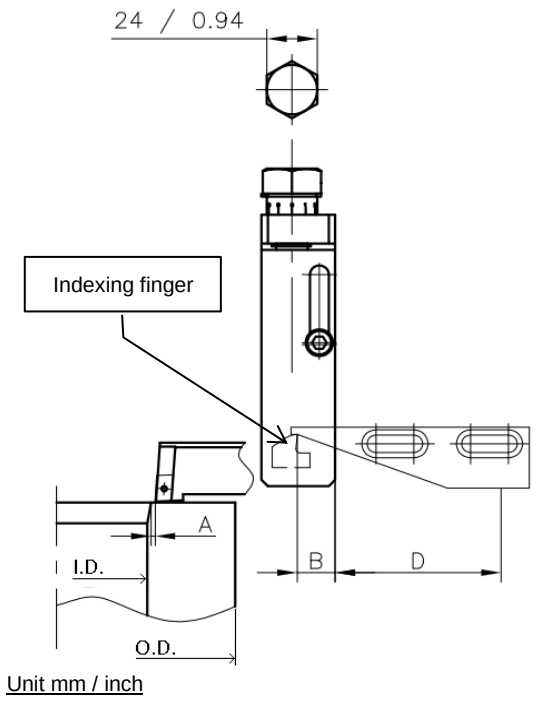

Diagram N° 6

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- Tighten the cam in position. If necessary, move the carriage so that all the clamping screws are accessible. Do not forget to remove tension from the spring by turning the hexagonal nut, so that the indexing finger and the template no longer make contact

- Lower the cam tracking bracket (hexagonal knob) to be below the cam and then back off with the tool carriage.

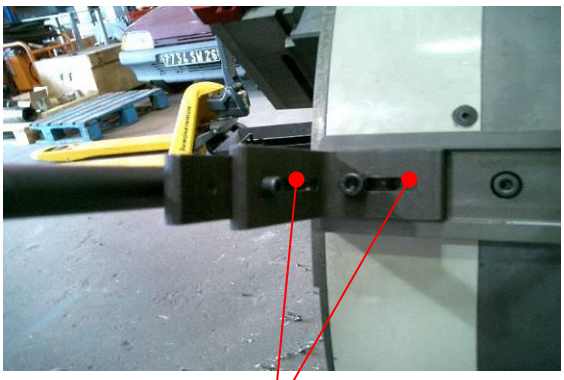
- Screw in the hexagonal handle so that the tracker makes contact with the cam.

- Tighten the cam tracker bracket.

- **Positioning the clutch finger**

  - Fix the clutch finger and its support onto the machine with the appropriate shims.

  - Adjust the incrementation height so that the clutch finger moves the star wheel by one or two teeth per revolution, depending on the type of machining operation.



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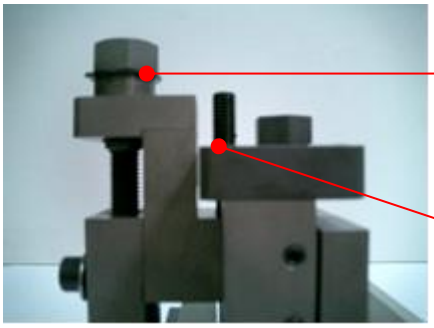
- **Machining**

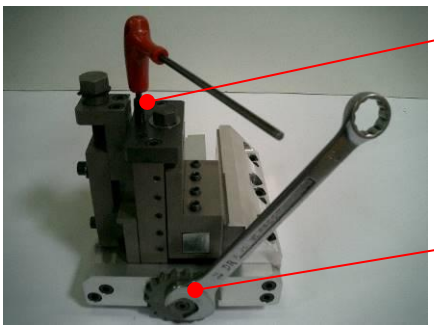


1st pass

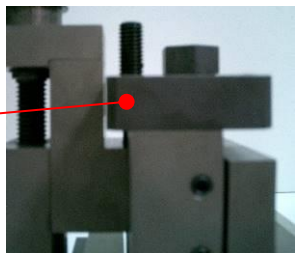
- Screw in the hexagonal knob completely to put the tool bit in its “up” position.
- Feed the carriage forward manually (turn the star wheel with a 24mm wrench) to position the insert about 1 or 2mm from the outside surface of the pipe.
- Unscrew the hexagonal knob for lowering the tool by 1 to 3mm (pass depth).

NB: The depth of pass must be adapted depending on the profile and the material being machined.

- Begin machining.
- Withdraw the tool from the pipe by turning the carriage manual return unit (turn the star wheel with a 24mm wrench) and the stop screw at the same time, visually checking that the tool does not make any contact with the material (the insert may be damaged).



Warning: Once the tool has been withdrawn from the pipe, the stop screw MUST be returned to its “up” position so that the indexing finger makes contact with the cam and, more particularly, to avoid damaging the stop screw when carrying out another machining operation.



2nd pass

- Unscrew the hexagonal knob for lowering the tool by 1 to 3mm (pass depth).

NB: The depth of pass must be adapted depending on the profile and the material being machined.

- Begin machining.
- Withdraw the tool from the pipe.

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Extra passes

- The depth and number of passes must be adapted depending on the profile and the material being machined.

NB: Check that the spring is still under tension. Whenever the spring needs to be re-tensioned, screw in the tensioning screw on the feed carriage.

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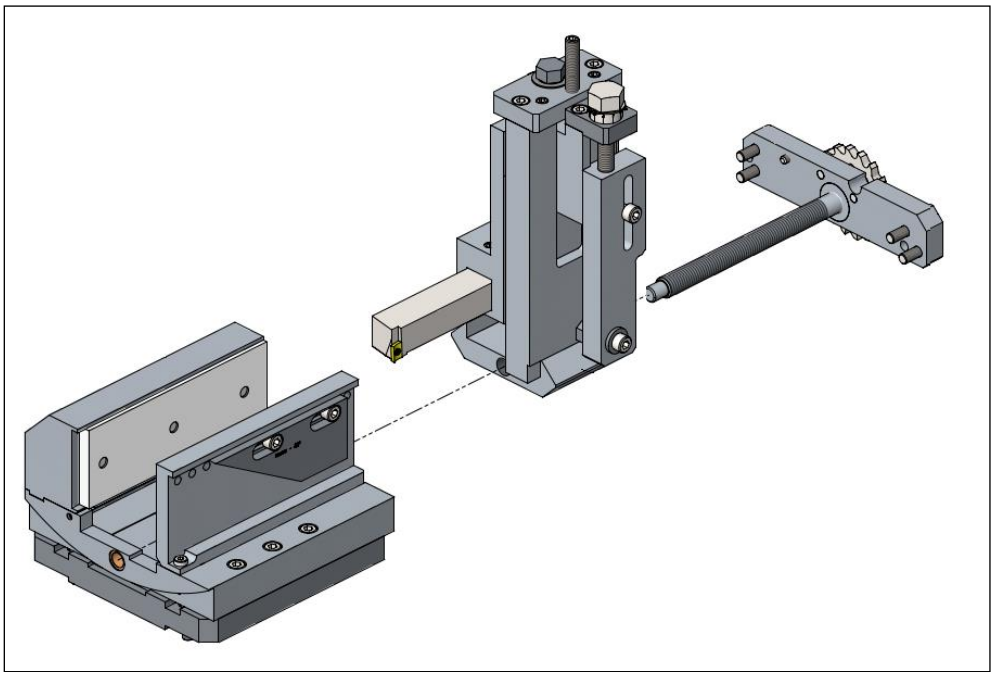
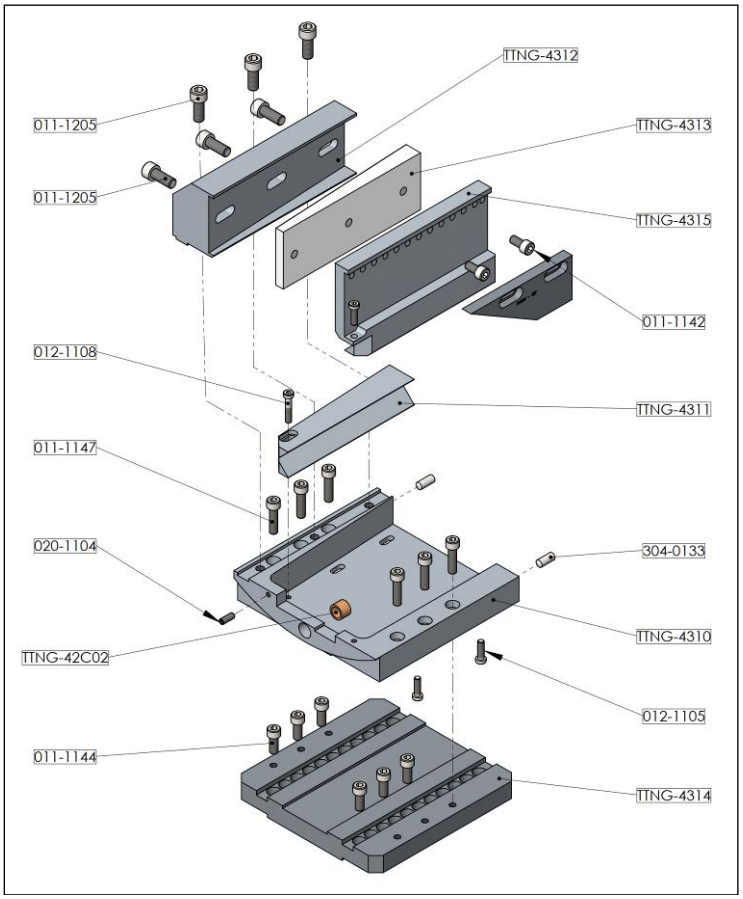
- **Exploded views of copying carriage with a traverse of 100mm: 01/21**





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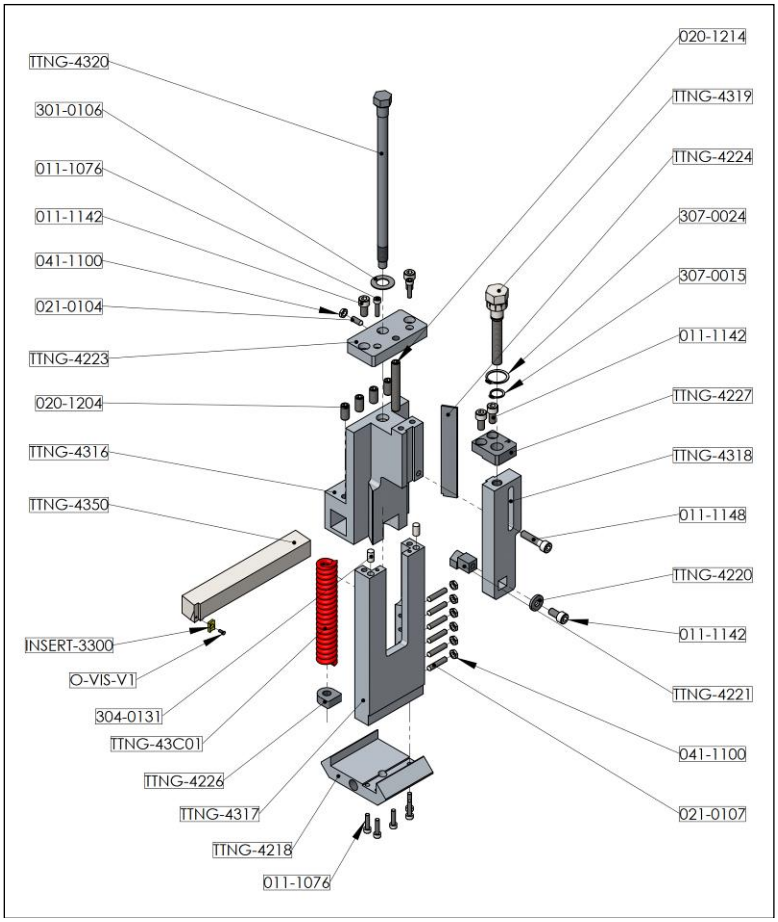

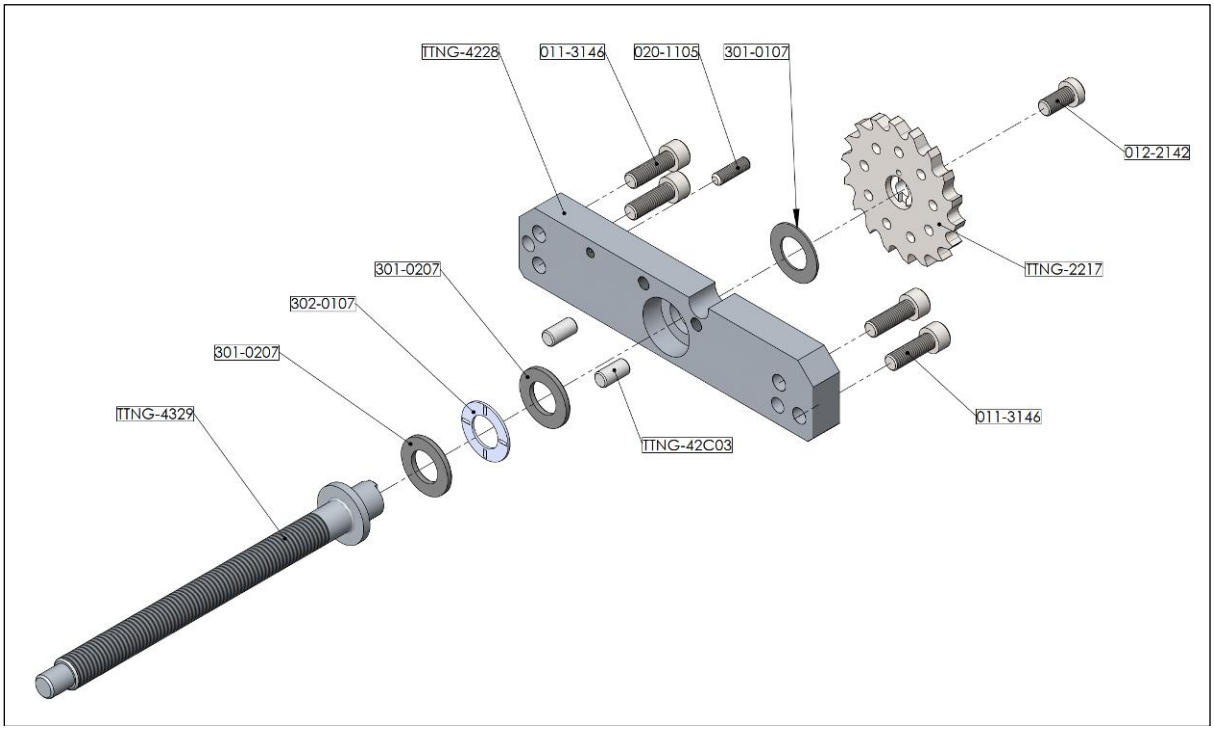

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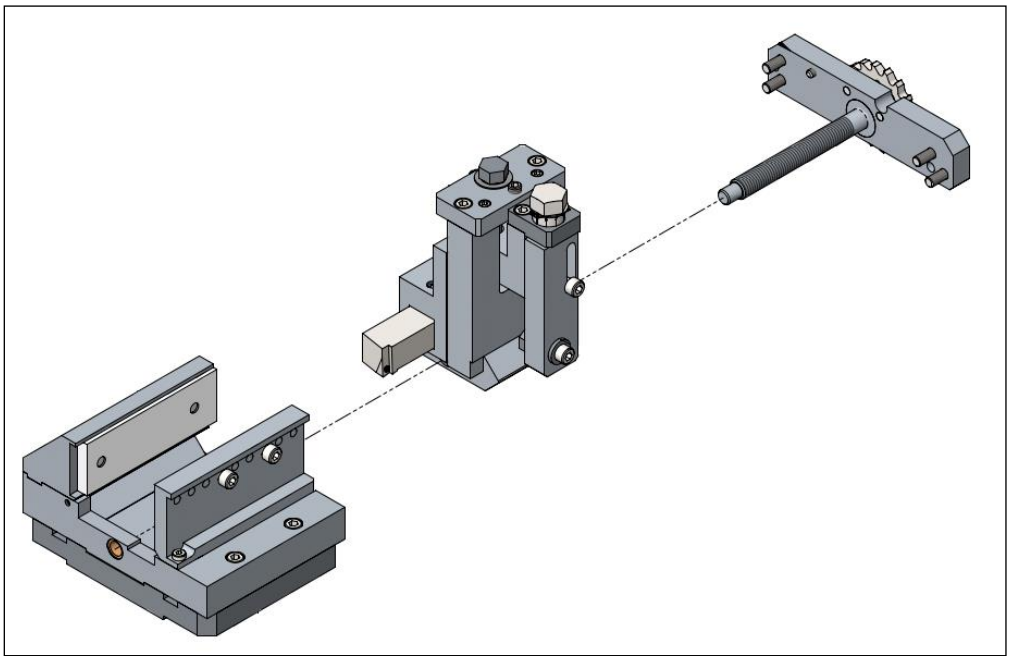
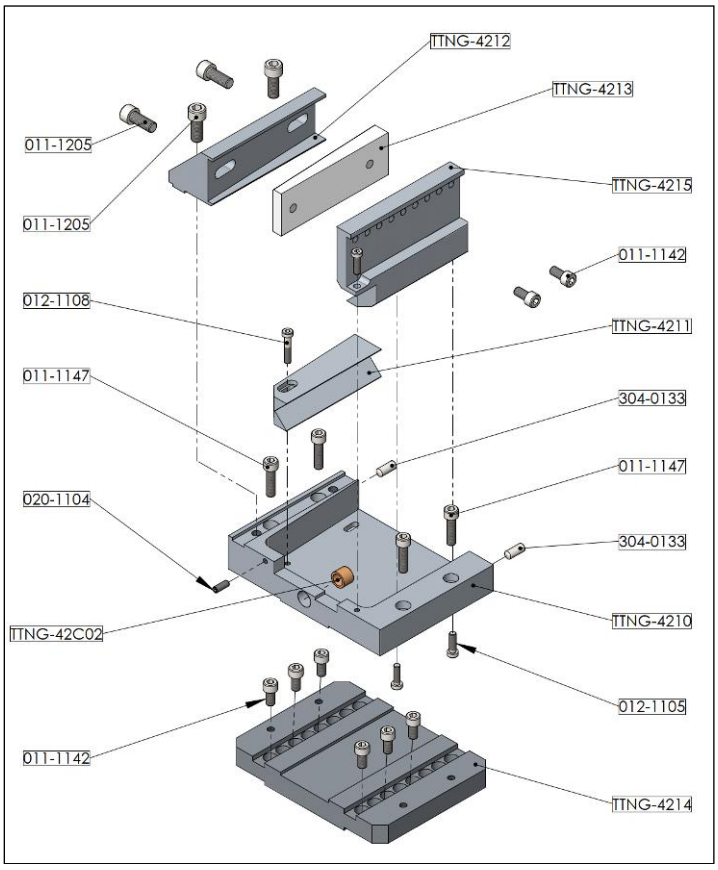
- **Exploded views of copying carriage with a traverse of 50 mm: 01/21**





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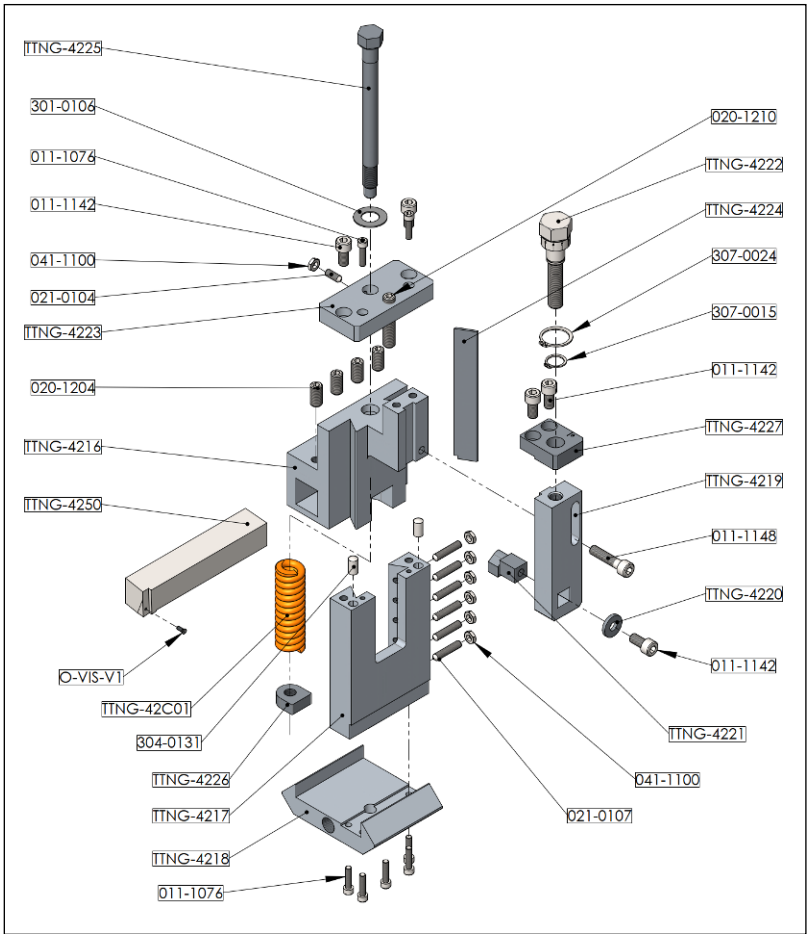

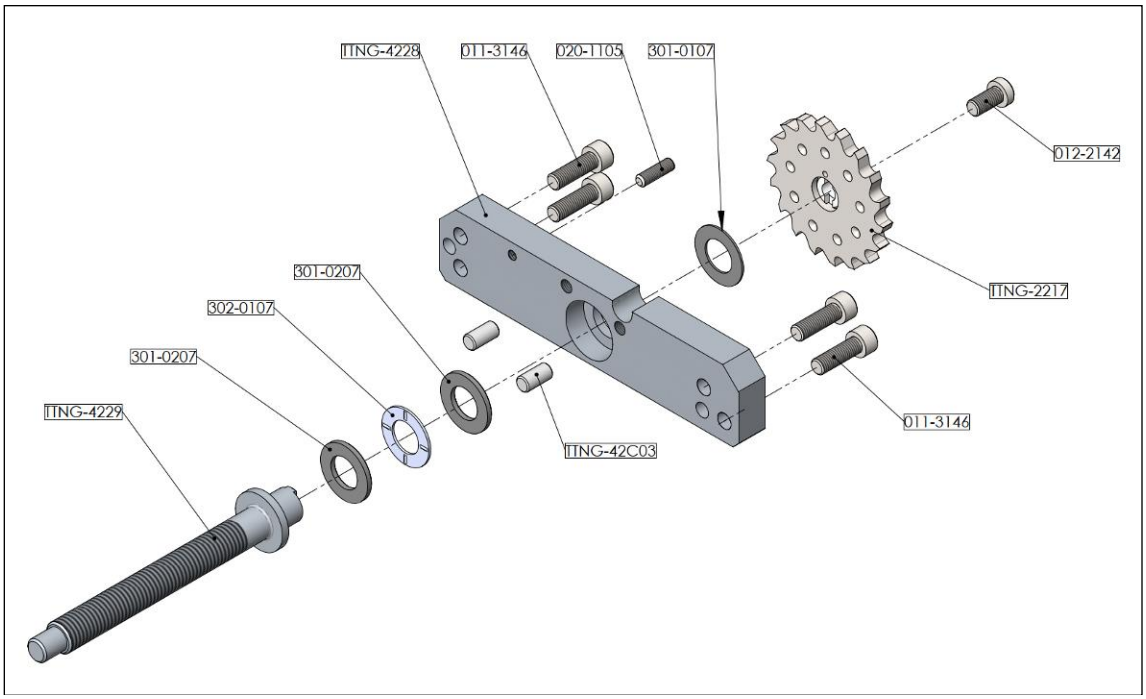

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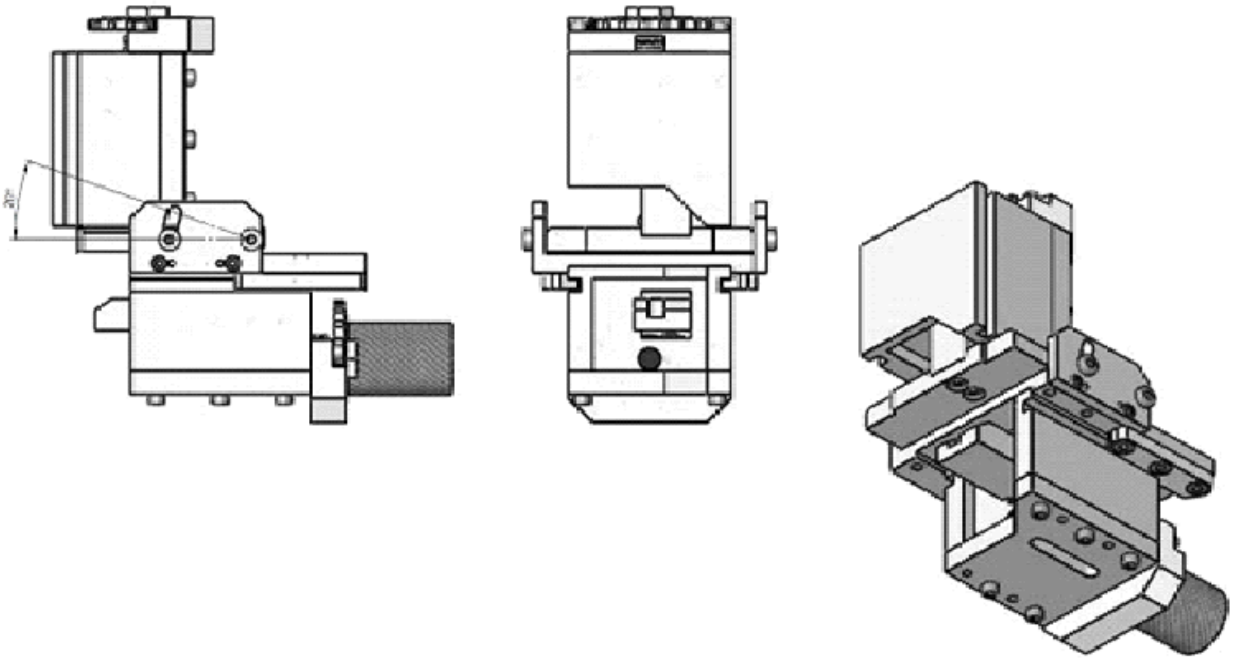
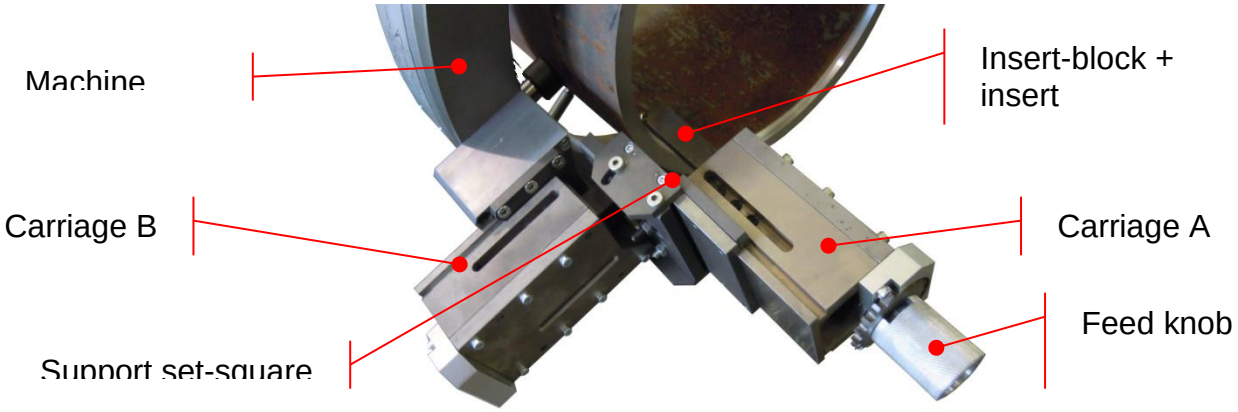
A.12.3 COUNTERBORING CARRIAGE



- **OPERATION**

- **Installing the counterboring carriage**

- Mount an insert on the tool-block and clamp in position.
- Install the tool-holder on the carriage equipped with a feed knob (Carriage A) and tighten in position.
- Adjust the angle of the angle-bracket (from 0 to 20°)
- Install carriage A onto the upper part of the angle bracket and tighten in position.
- Place the mobile part of the pass-depth carriage (Carriage B) at approximately its central position by turning the star wheel.
- Install the angle bracket + Carriage A on Carriage B and tighten in position.
- Install the complete assembly on the ring of the TT.



NB: Carriage B is supplied with the TT machine.
The TT is required for using the counterboring option.

- **Setting the position of the counterboring carriage**

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- Position carriage B so that the insert is at a tangent with the I.D. of the pipe (warning: the carriage holding plates must be loosened).
- Re-tighten Carriage B holding plates.
- Rotate the tool plate at low speed and make a complete turn to check that the angle bracket does not touch the OD of the pipe anywhere.
- Loosen the bars holding Carriage A onto the angle bracket.
- Adjust the position of Carriage A so that the tool-holder is about 5mm from the beginning of the pipe and re-tighten the clamping bars.
- Set the depth of pass by turning the star-wheel clockwise to back off carriage B.
- The machine is now ready for counterboring.

- **Counterboring**

- Start rotating the TTNG
- Use the feed knob on carriage A (1 tooth = 0.08mm) to make the insert feed into the pipe until the pass has been completed.
- Stop the TTNG
- Use the feed knob on carriage A for raising the insert above the pipe.
- Set the depth of pass by turning the star-wheel clockwise to back off carriage A.
- Repeat the last five steps until you have the counterboring profile you require.

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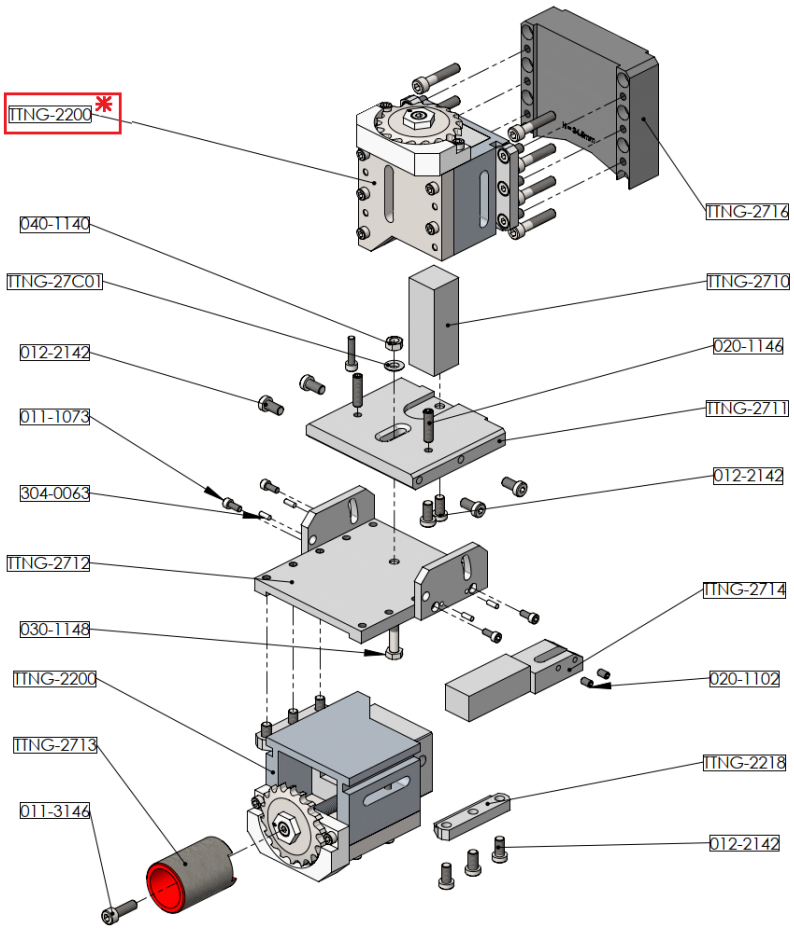
- **Exploded view: Tool carriage with a 50mm traverse together with its tool-holder**



N°	Description	Designation	Beschreibung	Qty	Reference
TTNG-2710	Arm	Bras chariot de délardage		1	**TTNG-2710**
TTNG-2711	Holder	Support		1	**TTNG-2711**
TTNG-2712	Tool holder support	Support porte outil		1	**TTNG-2712**
TTNG-27C01	spacer	Rondelle		1	**TTNG-27C01**
304-0063	Cylindrical pin	Goupille		4	**304-0063**
040-1140	Nut	Ecrou		1	**040-1140**
011-1073	screw	Vis		4	**011-1073**
020-1146	screw	Vis		2	**020-1146**
011-3146	screw	Vis		1	**011-3146**
012-2142	Low head screw	Vis Tête Basse		10	**012-2142**
030-1148	screw	Vis		1	**030-1148**
TTNG-2713	Knob	Poignée		1	**TTNG-2713**
TTNG-2714	Tool holder	Porte outil		1	**TTNG-2714**
TTNG-2716	Riser plate	Réhausse		1	**TTNG-2716**
020-1102	Screw	Vis		2	**020-1102**

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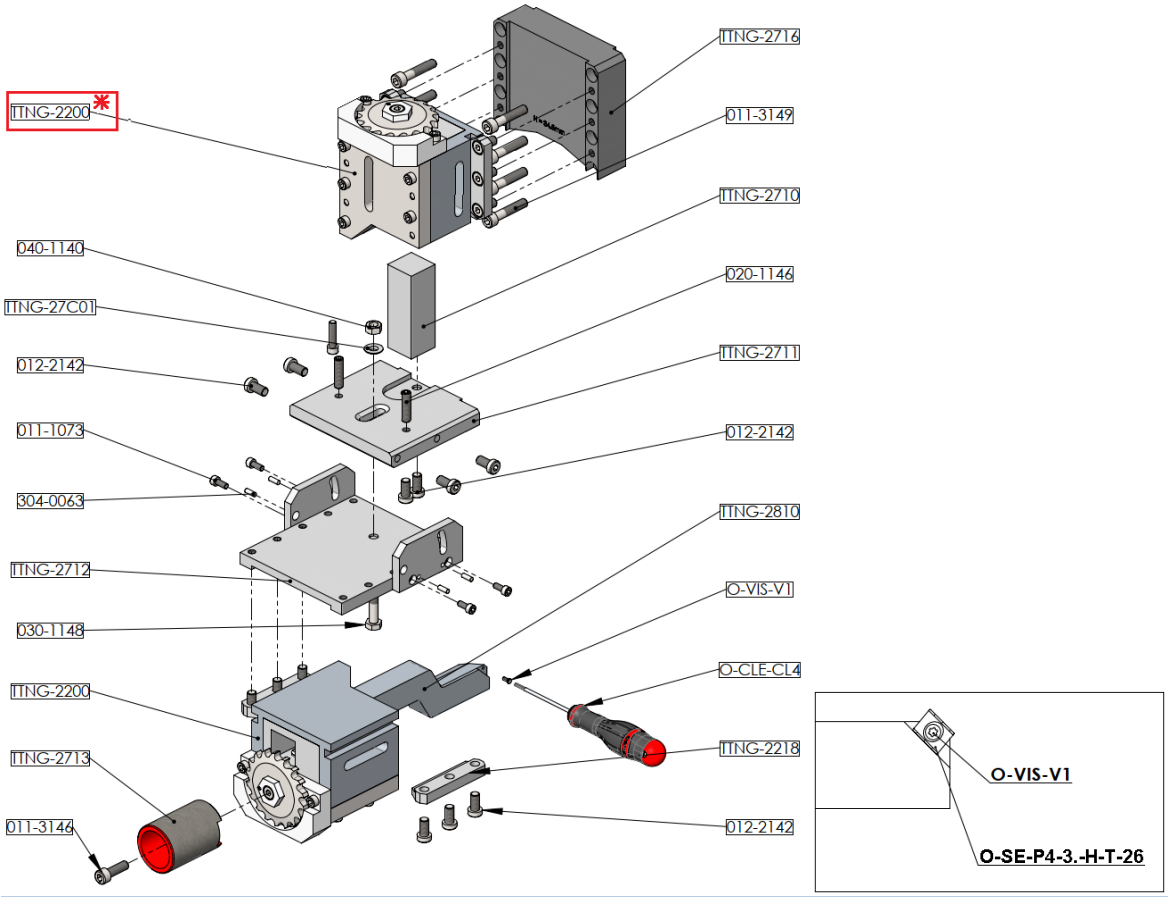
TTNG-2200	Tool holder carriage 50mm traverse	Chariot porte outil course 50mm		1	**TTNG-2200**
TTNG-2218	Fixing plate	Barette de fixation		2	**TTNG-2218**
011-3149	Screw	Vis		6	**011-3149**
*	*NOTA : Ce chariot n'est pas fourni avec l'option. Utiliser l'un des 2 chariots déjà fourni avec la machine TTNG standard.* *NOTE: This carriage is not supplied with the option. Use one of the 2 carriages already supplied with the standard TTNG machine.*				

- **Exploded view: Tool carriage with a 50mm traverse together with its insert-block**



N°	Description	Designation	Beschreibung	Qty	Reference
TTNG-2710	Arm	Bras chariot de délardage		1	**TTNG-2710**
TTNG-2711	Holder	Support		1	**TTNG-2711**
TTNG-2712	Tool holder support	Support porte outil		1	**TTNG-2712**
TTNG-27C01	spacer	Rondelle		1	**TTNG-27C01**
304-0063	Cylindrical pin	Goupille		4	**304-0063**
040-1140	Nut	Ecrou		1	**040-1140**
011-1073	screw	Vis		4	**011-1073**
020-1146	screw	Vis		2	**020-1146**
011-3146	screw	Vis		1	**011-3146**

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012-2142	low head screw	Vis Tête Basse		10	**012-2142**
030-1148	screw	Vis		1	**030-1148**
TTNG-2713	Knob	Poignée		1	**TTNG-2713**
TTNG-2716	Riser plate	Réhausse		1	**TTNG-2716**
TTNG-2810	Insert holder	Porte plaquette		1	**TTNG-2810**
O-VIS-V1	Insert screw	Vis plaquette		1	**O-VIS-V1**
O-SE-P4-3.-H-T-26	Insert	Plaquette		1	**O-SE-P4-3.-H-T-26**
O-CLE-CL4	Insert wrench	Clé plaquette		1	**O-CLE-CL4**
TTNG-2200	Tool holder carriage 50mm traverse	Chariot porte outil course 50mm		1	**TTNG-2200**
TTNG-2218	Fixing plate	Barette de fixation		2	**TTNG-2218**
011-3149	Screw	Vis		6	**011-3149**
*	*NOTA : Ce chariot n'est pas fourni avec l'option. Utiliser l'un des 2 chariots déjà fourni avec la machine TTNG standard.* *NOTE: This carriage is not supplied with the option. Use one of the 2 carriages already supplied with the standard TTNG machine.*				

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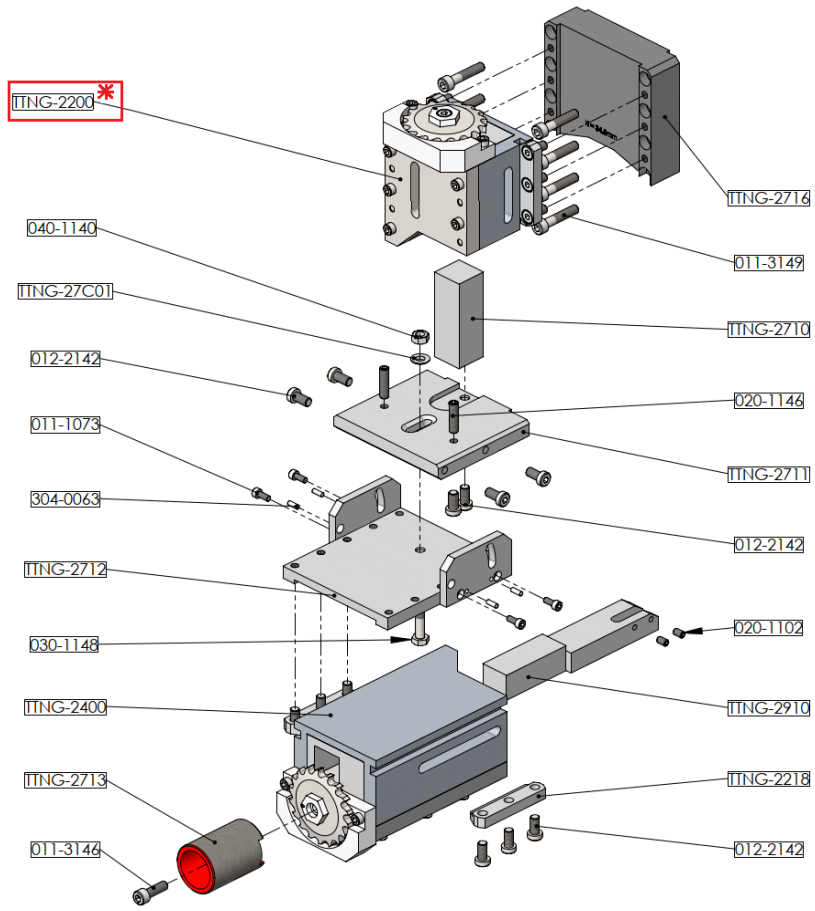
- **Exploded view: Tool carriage with a 100mm traverse together with its tool-holder**



N°	Description	Designation	Beschreibung	Qty	Reference
TTNG-2710	Counterboring carriage arm	Bras chariot de délardage		1	**TTNG-2710**
TTNG-2711	Holder	Support		1	**TTNG-2711**
TTNG-2712	Tool holder support	Support porte outil		1	**TTNG-2712**
TTNG-27C01	spacer	Rondelle		1	**TTNG-27C01**
304-0063	Cylindrical pin	Goupille		4	**304-0063**
040-1140	Nut	Ecrou		1	**040-1140**
011-1073	screw	Vis		4	**011-1073**
020-1146	screw	Vis		2	**020-1146**
011-3146	screw	Vis		1	**011-3146**
012-2142	screw	Vis		10	**012-2142**
030-1148	screw	Vis		1	**030-1148**
TTNG-2713	Knob	Poignée		1	**TTNG-2713**
TTNG-2910	Tool holder	Porte outil		1	**TTNG-2910**
TTNG-2716	Riser plate	Réhausse		1	**TTNG-2716**
020-1102	screw	Vis		2	**020-1102**

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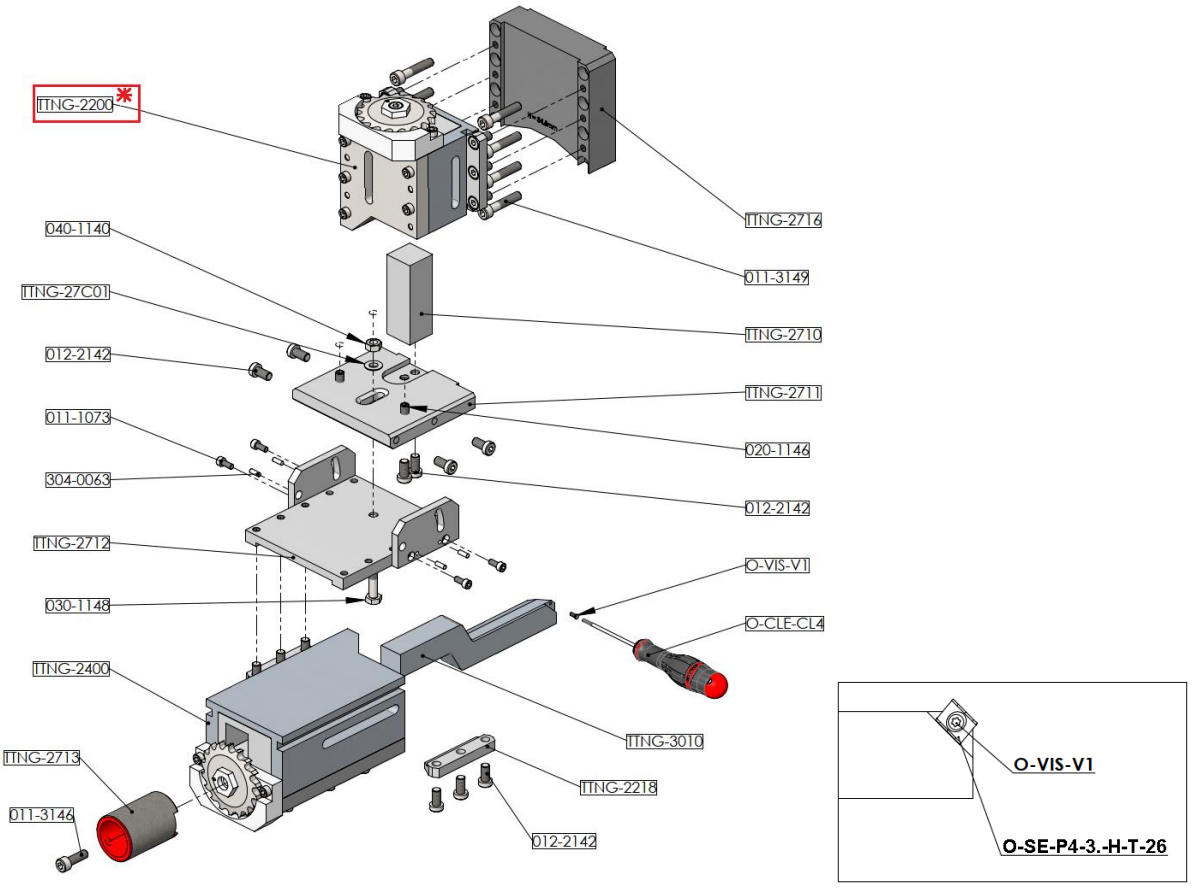
TTNG-2400	Tool holder carriage traverse	Chariot porte outil course		1	**TTNG-2400**
TTNG-2218	Fixing plate	Barette de fixation		2	**TTNG-2218**
011-3149	screw	Vis		6	**011-3149**
*	*NOTA : Ce chariot n'est pas fourni avec l'option. Utiliser l'un des 2 chariots déjà fourni avec la machine TTNG standard.* *NOTE: This carriage is not supplied with the option. Use one of the 2 carriages already supplied with the standard TTNG machine.*				

- **Exploded view: Tool carriage with a 100mm traverse together with its insert-block**



N°	Description	Designation	Beschreibung	Qty	Reference
TTNG-2710	Arm	Bras chariot de délardage		1	**TTNG-2710**
TTNG-2711	Holder	Support		1	**TTNG-2711**
TTNG-2712	Tool holder support	Support porte outil		1	**TTNG-2712**
TTNG-27C01	spacer	Rondelle		1	**TTNG-27C01**
304-0063	Cylindrical pin	Goupille		4	**304-0063**
040-1140	Nut	Ecrou		1	**040-1140**
011-1073	screw	Vis		4	**011-1073**
020-1146	screw	Vis		2	**020-1146**
011-3146	screw	Vis		1	**011-3146**

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012-2142	screw	Vis		10	**012-2142**
030-1148	screw	Vis		1	**030-1148**
TTNG-2713	Knob	Poignée		1	**TTNG-2713**
TTNG-2716	Riser plate	Réhausse		1	**TTNG-2716**
TTNG-3010	Insert holder	Porte plaquette		1	**TTNG-2810**
O-SE-P4-3.-H-T-26	Insert	Plaquette		1	**O-SE-P4-3.-H-T-26**
O-VIS-V1	Insert screw	Vis plaquette		1	**O-VIS-V1**
O-CLE-CL4	Insert wrench	Clé plaquette		1	**O-CLE-CL4**
TTNG-2400	Tool holder carriage 100mm traverse	Chariot porte outil course 100mm		1	**TTNG-2400**
TTNG-2218	Fixing plate	Barette de fixation		2	**TTNG-2218**
011-3149	screw	Vis		6	**011-3149**
*	*NOTA : Ce chariot n'est pas fourni avec l'option. Utiliser l'un des 2 chariots déjà fourni avec la machine TTNG standard.* *NOTE: This carriage is not supplied with the option. Use one of the 2 carriages already supplied with the standard TTNG machine.*				

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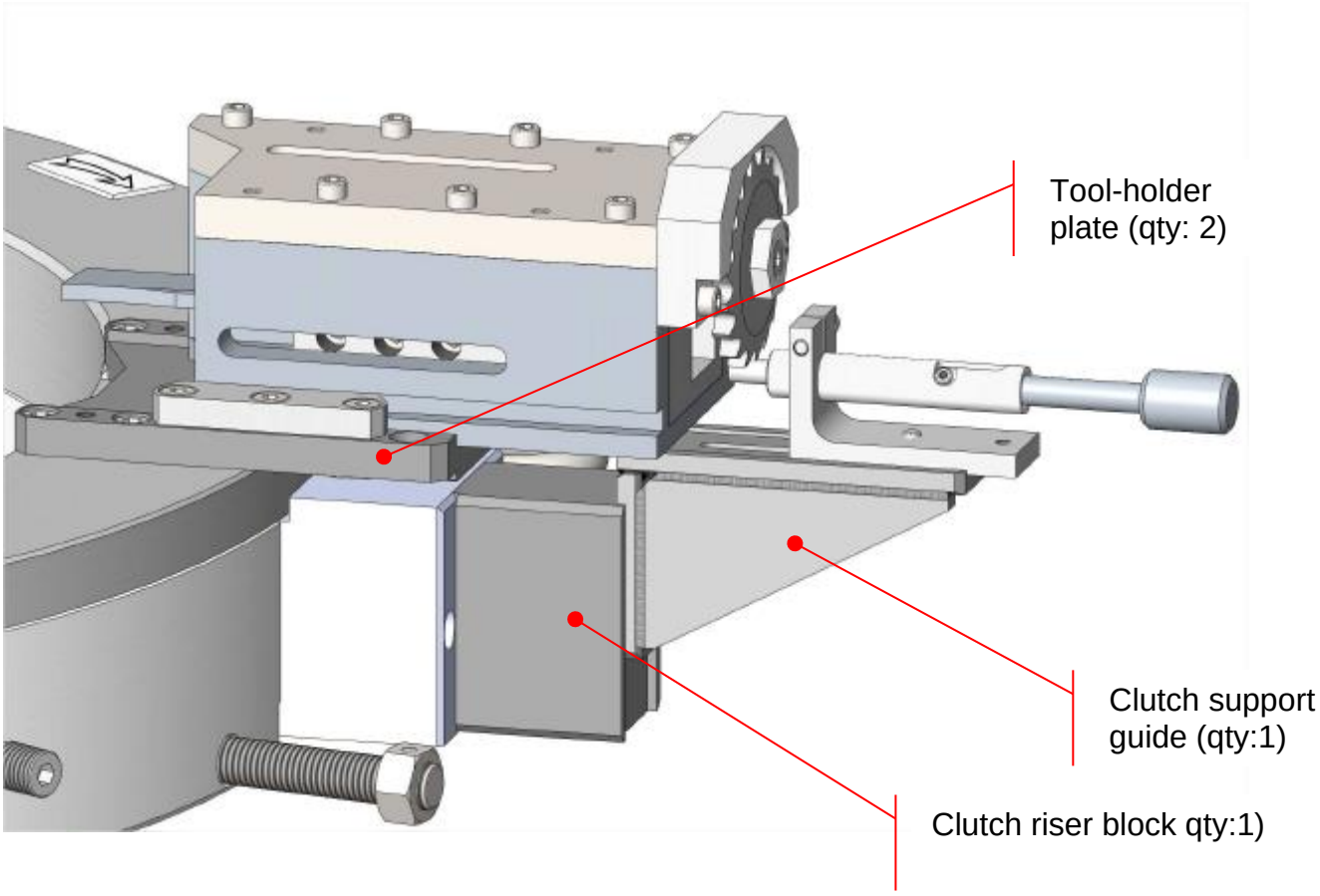
A.12.4 OPTIONAL EXTENSION KIT

- **Description**

For all TTNG machine models (from TTNG168 to TTNG900), depending on the machining configuration to be used, certain parameters such as the use of long tools such as the TT22 -TT18 - TT11 - TT15, etc., machining thicker pipes (≥ 50mm), machining on an external diameter close to the maximum capacity of the machine concerned (e.g.: machining a pipe ø762 O. D. pipe with a TTNG 762) require the use of the extension kit (described below). For all types of machining configurations, this kit enables the tool-holder to be positioned and held firmly on the tool plate.

Please consult the PROTEM commercial department for any special requirements.



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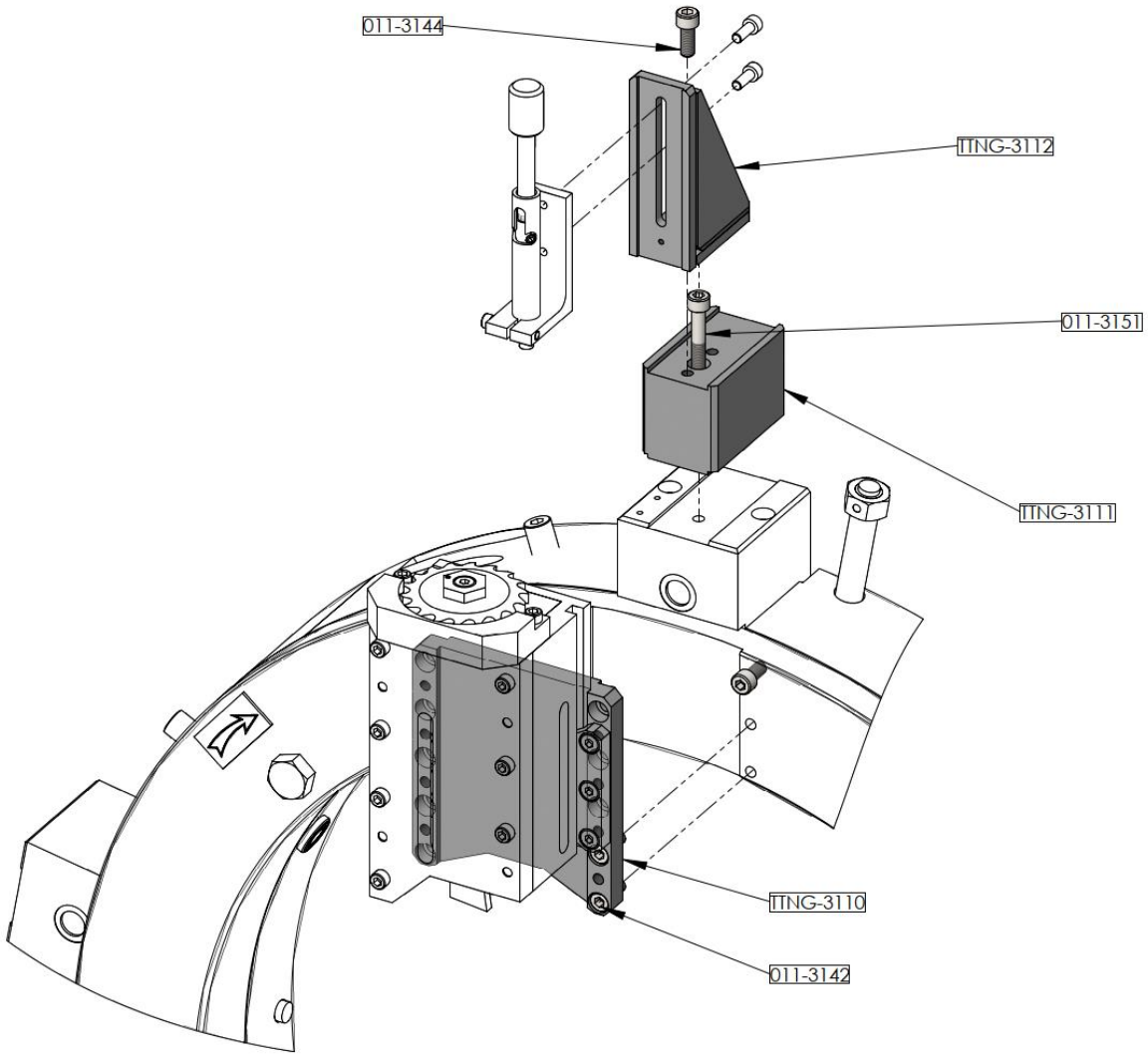
Optional extension kit



N°	Description	Designation	Beschreibung	Qty	Reference
3110	Tool-holder sole plate	Semelle porte-outils		2	**TTNG-3110**
3111	Clutch riser block	Réhausse embrayage		1	**TTNG-3111**
3112	Clutch support guide	Guide support embrayage		1	**TTNG-3112**
011-3142	screw	Vis		12	**011-3142**
011-3144	screw	Vis		1	**011-3144**
011-3151	screw	Vis		1	**011-3151**

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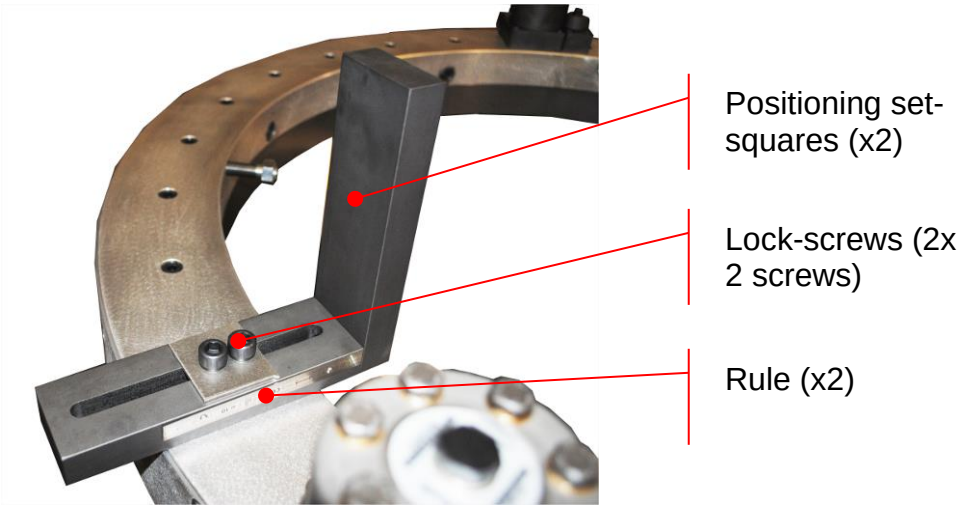
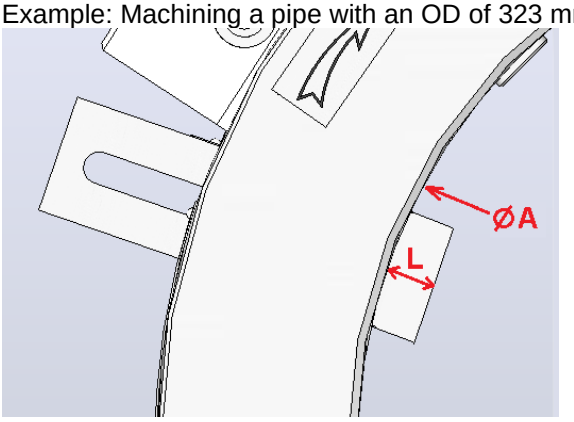
A.12.5 POSITIONING THE SET-SQUARE OPTION

- **Description**

These set squares are designed for pre-positioning the machining unit on the pipe to be machined.



- Loosen the 2 lock-screws with a 10mm Allen key and set the dimension L on both brackets.
L = (ID of the machine body (øA §A-2-1) – pipe OD) / 2
Example: Machining a pipe with an OD of 323 mm with a TTNG-406: L = (415-323)/2 = 46mm



- Put the machine in place by putting the set-square in contact with the OD of the pipe to be machined and then lock the clamping jaws in place as described in paragraph A-3-2.

⚠	These set-squares ARE IN NO WAY DESIGNED for clamping the machine onto the pipe. Final clamping must be made with the clamping jaws and the stabilizer screws as shown in paragraph A-3-2.

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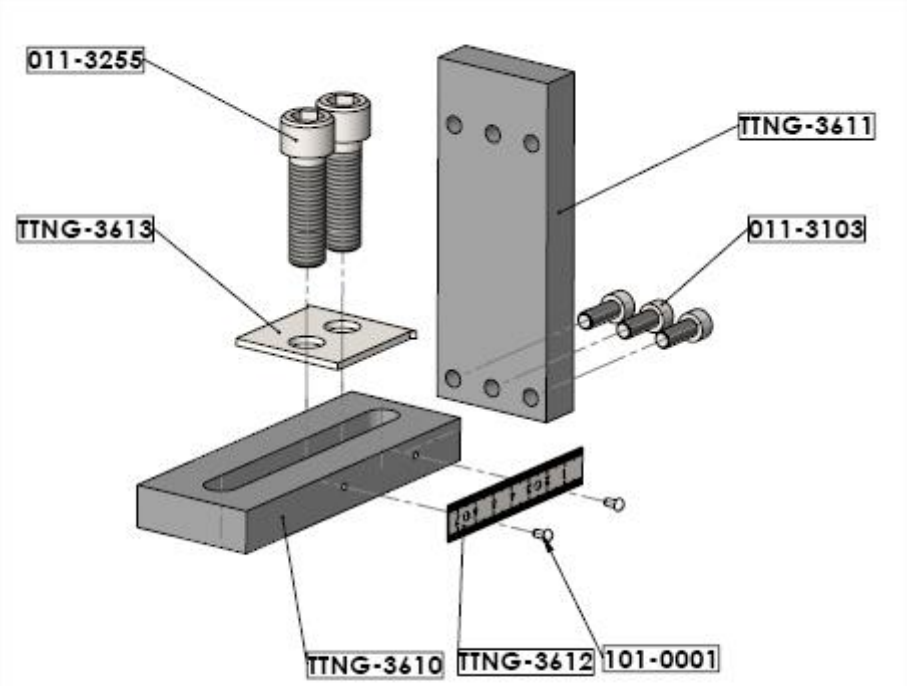
- **Exploded view**

Option: Positioning set-square for TTNG 168 to TTNG 406



N°	Description	Designation	Beschreibung	Qty	Reference
3610	Holding flat	Plat de fixation		1	TTNG-3610
3611	Pipe contact flat	Plat appui tube		1	TTNG-3611
3612	Short rule	Réglet court		1	TTNG-3612
3613	Setting washer	Rondelle réglage		1	TTNG-3613
011-3103	screw	Vis		3	011-3103
011-3255	screw	Vis		2	011-3255
101-0001	Gun rivet	Rivet à frapper		2	101-0001

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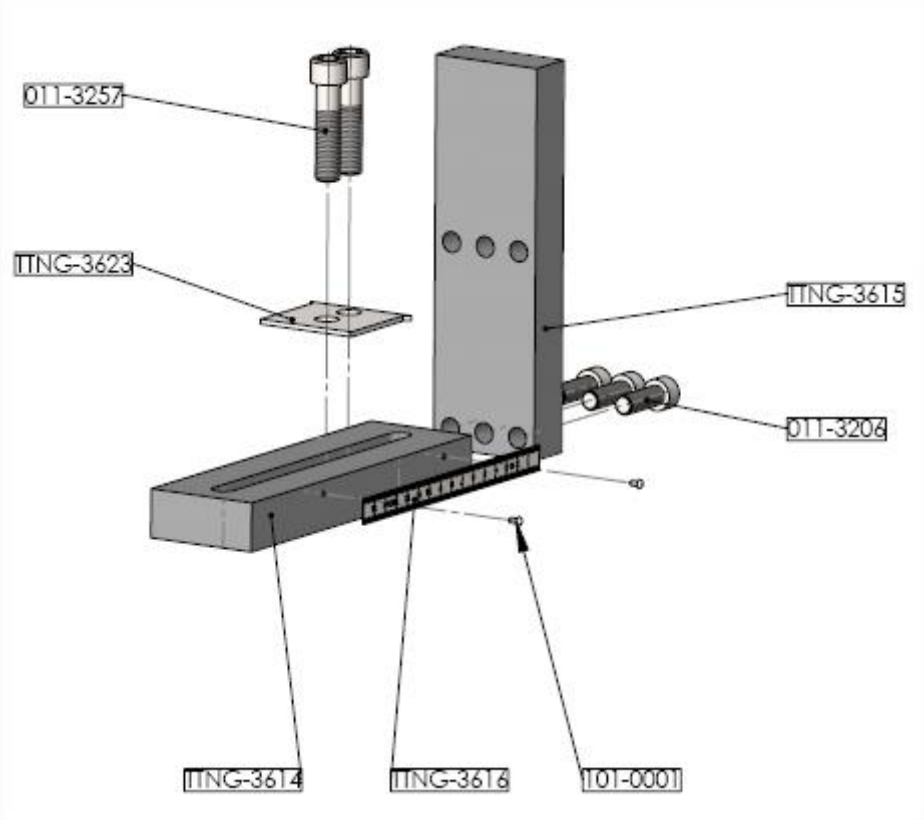
Option: Positioning set-square for TTNG 508 to TTNG 1016



N°	Description	Designation	Beschreibung	Qty	Reference
3614	Holding flat	Plat de fixation		1	TTNG-3614
3615	Pipe contact flat	Plat appui tube		1	TTNG-3615
3616	Long rule	Réglet Long		1	TTNG-3616
3623	Setting washer	Rondelle réglage		1	TTNG-3623
011-3257	screw	Vis		2	011-3257
011-3206	screw	Vis		3	011-3206
101-0001	Gun rivet	Rivet à frapper		2	101-0001

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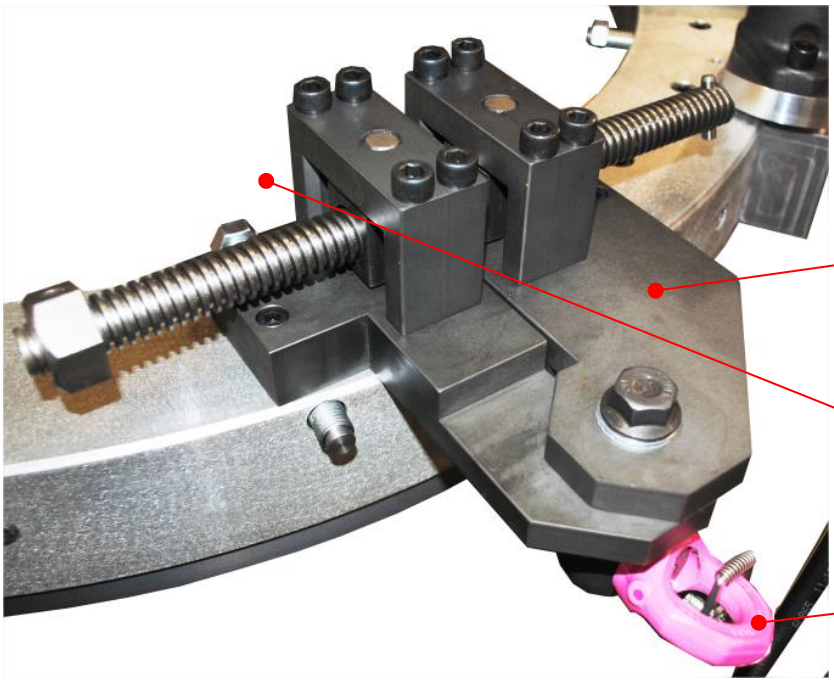
A.12.6 HINGE AND OPENING ECCENTRIC OPTION

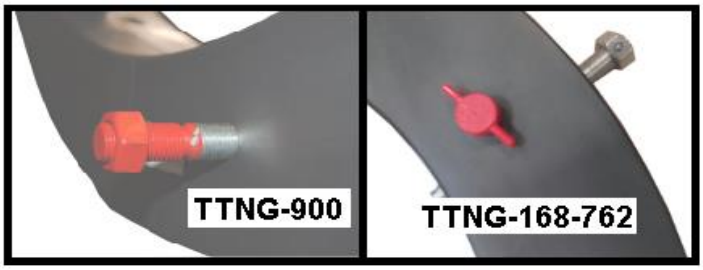
- **Description**

The hinge and opening eccentric are designed for opening the machine into two halves so that it can be fitted around the pipe to be machined.



Installation procedure:

- Back up the base jaws as far as possible before placing the machine on the pipe to be machined.



Warning: Before using the opening hinge, make sure that the two lock-screws with red heads are in place for holding the rotating parts in position in relation to the fixed machine body.

- Raise the machine using the lifting eye. Use suitable lifting equipment for all hoisting operations. Operators must be qualified.

- Loosen the 6 screws for assembling the fixed and rotating assemblies (See photo below).

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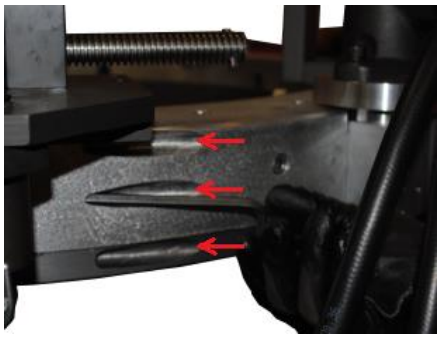
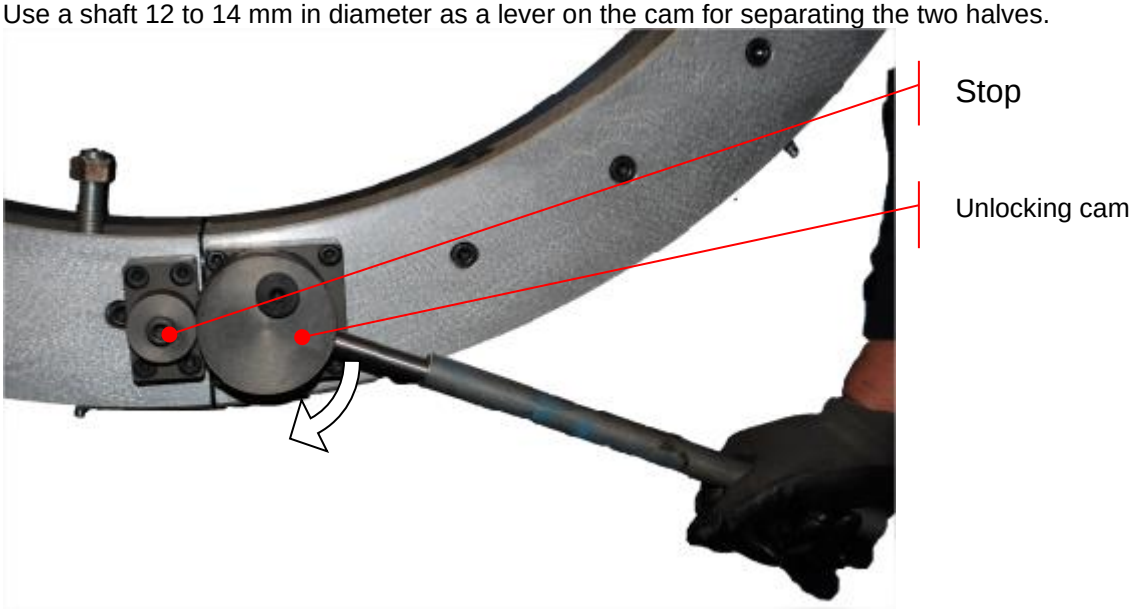


- Check that the mating surfaces are in line before opening the machine into two halves.
- Use the opening eccentric for separating the two halves of the fixed and rotating assemblies: Use a shaft 12 to 14 mm in diameter as a lever on the cam for separating the two halves.



- Open the machine by turning the trapezoidal screw (counter-clockwise) with a 24mm spanner. Make sure that the opening D is large enough for the machine to be placed around the pipe to be machined.

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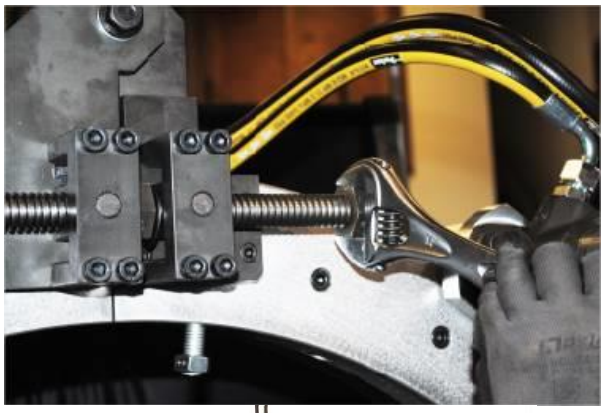
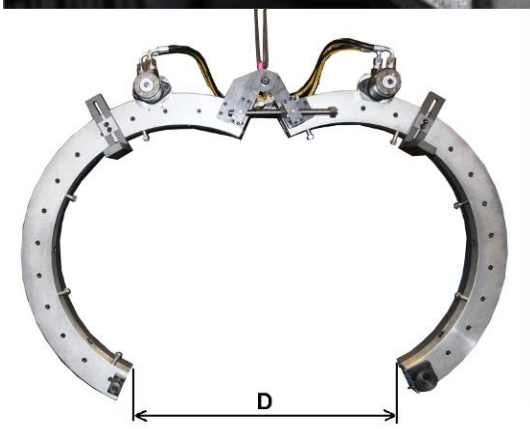
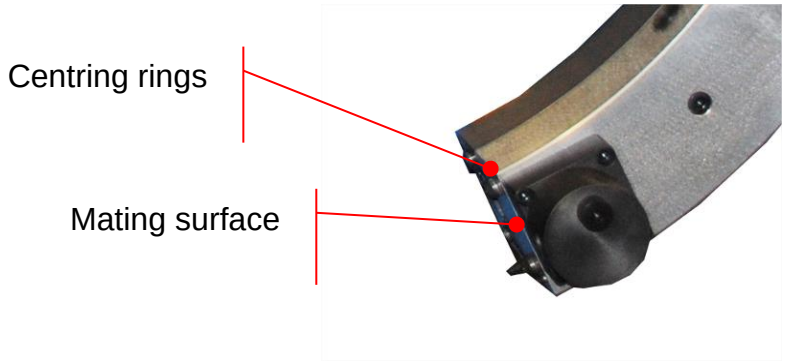




- Warning: Take care not to damage the mating surfaces on the half-rings when installing the machine.



- Re-close the machine around the pipe using the 24mm flat wrench (clockwise) When closing the mating surfaces, make sure that the centring rings on the half units are correctly in place and that there are no foreign bodies on the mating surfaces.

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Warning: before tightening the 6 screws for holding the fixed and rotating sections, make sure that the opening system is completely free and check that the support washer is free to move (see below).

- Screw up and tighten the 6 screws on the fixed and rotating parts.

WARNING: Before making the machine turn DO NOT FORGET TO remove the red screws (Item 7).

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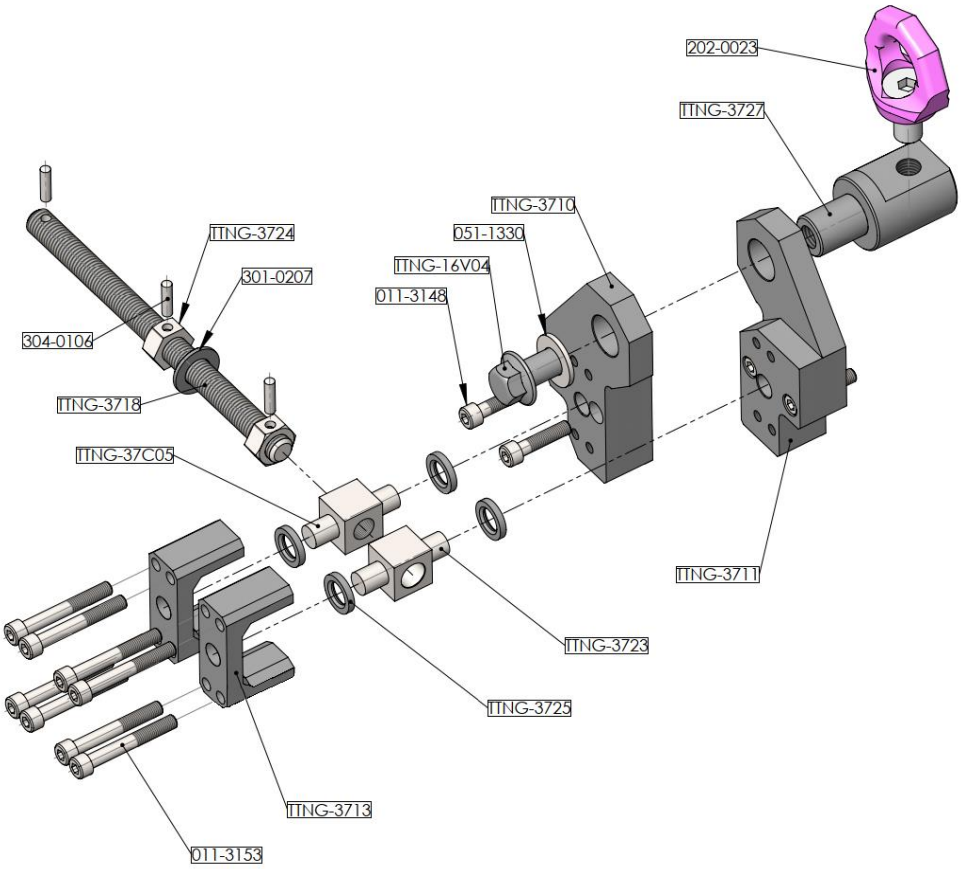
- **Exploded view of opening hinge option for TTNG 168 to TTNG 508**



N°	Description	Designation	Beschreibung	Qty	Reference
3727	Shaft	Axe		1	TTNG-3727
3725	Spacer	Entretoise		4	TTNG-3725
3723	2-lug nut	Ecrou à 2 tenons		1	TTNG-3723
3718	Lead screw + 2x nut + 3x pin	Vis trapèzoidale + 2x écrous D16 ref.3724 + 3x goupilles ref.304-0106		1	TTNG-3718
3710	Male yoke	Chape male		1	TTNG-3710
3711	Female yoke	Chape femelle		1	TTNG-3711
3713	Nut support	Support écrou		2	TTNG-3713
301-0207	Thin washer	Rondelle mince		1	301-0207
011-3153	screw	Vis		8	011-3153
011-3148	screw	Vis		4	011-3148
TTNG-16V04	flange-head screw	Vis à embase		1	TTNG-16V04
051-1330	Medium washer	Rondelle moyenne		1	051-1330
TTNG-37C05	2-lug nut	Ecrou à 2 tenons		1	TTNG-37C05
202-0023	rotating hoisting ring	Anneau de levage rotatif		1	202-0023

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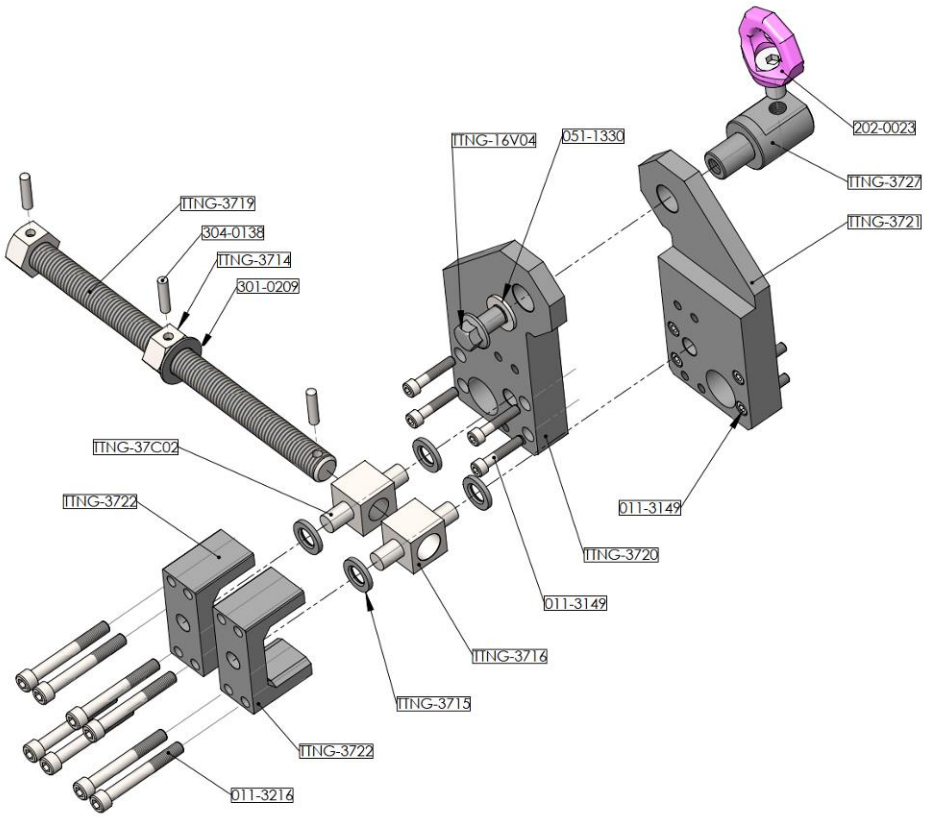
- **Exploded view of opening hinge option for TTNG 610 to TTNG 762**



N°	Description	Designation	Beschreibung	Qty	Reference
3727	Shaft	Axe		1	TTNG-3727
3715	Spacer	Entretoise		4	TTNG-3715
3716	2-lug nut	Ecrou à 2 tenons		1	TTNG-3716
3719	Lead screw + 2x nut + 3x pin	Vis trapèzoidale + 2x écrous + 3x goupilles		1	TTNG-3719
3720	Male yoke	Chape male		1	TTNG-3720
3721	Female yoke	Chape femelle		1	TTNG-3721
3722	Nut support	Support écrou		2	TTNG-3722
301-0209	Thin washer	Rondelle mince		1	301-0209
011-3216	screw	Vis		8	011-3216
011-3149	screw	Vis		8	011-3149
TTNG-16V04	screw	Vis		1	TTNG-16V04
051-1330	Medium washer	Rondelle moyenne		1	051-1330
TTNG-37C02	2-lug nut	Ecrou à 2 tenons		1	TTNG-37C02
202-0023	rotating hoisting ring	Anneau de levage rotatif		1	202-0023

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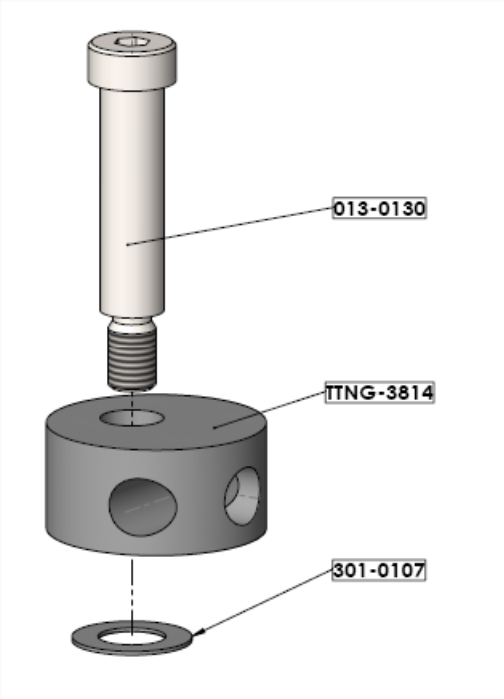
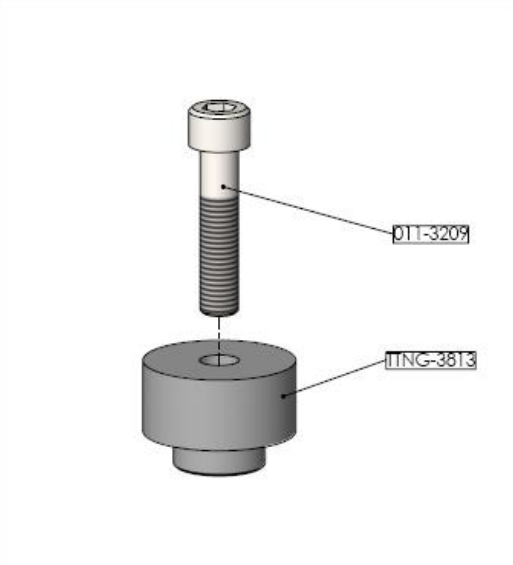
- **Exploded view of eccentric opening option for TTNG 168 to TTNG 762**





N°	Description	Designation	Beschreibung	Qty	Reference
TTNG-3814	Release cam	Came de déblocage		1	TTNG-3814
301-0107	Washer	Rondelle		1	301-0107
013-0130	12x60 Allen screw	Vis épaulée à 6 pans creux 12x60		1	013-0130
TTNG-3813	Stop	Butée		1	TTNG-3813
011-3209	screw	Vis		1	011-3209

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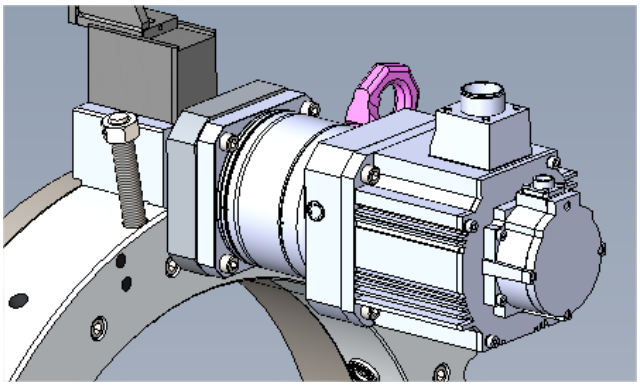
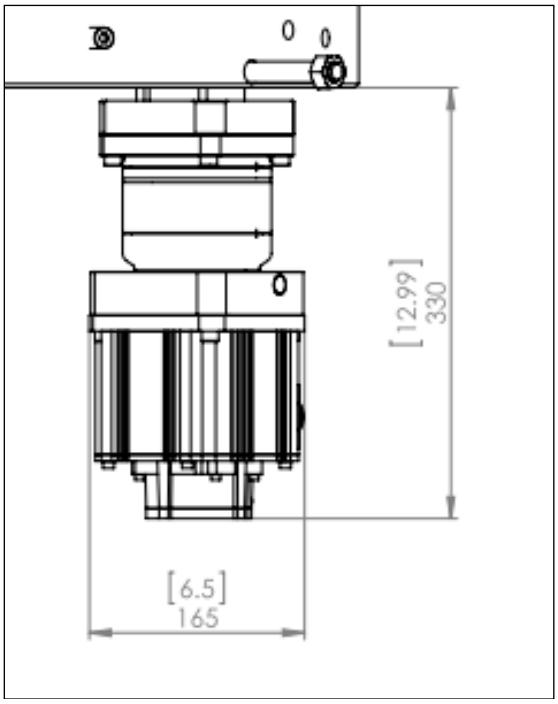
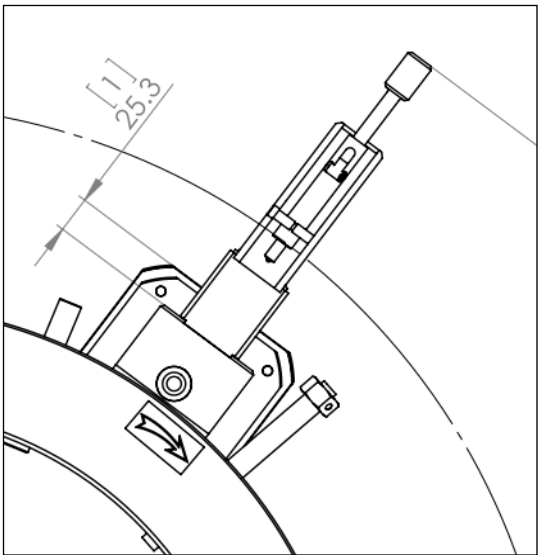
A.12.7 1.5 KW BRUSHLESS ELECTRIC MOTOR



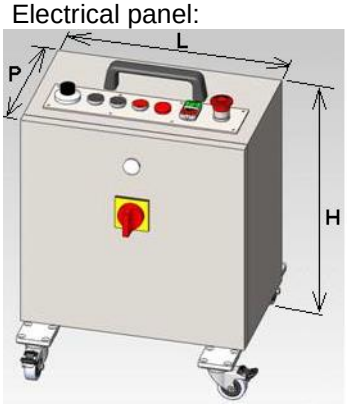
Outside dimensions:

Machine:





Electrical panel:



H = 410mm
L = 410mm
D = 260mm

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Technical specifications:

Motor:
1.5kW brushless geared motor with variable speed drive

Power supply:
- Single phase 170-264V or 2-phasé 170-264V
- Or 3-phasé 323 – 528V (depending on the configuration of the control box)
- F=50-60Hz

Warning:
Before putting the machine into service on-site, you MUST familiarize yourself with its electrical specifications (see above).
If the electricity network does not comply with these characteristics, this is liable to have serious consequences on the machine's electrical components and cause important breakdowns. Therefore, should you discover any incompatibility between your electricity network and the machine, please contact Protem and/or provide the equipment required for supplying the machine within the voltage ranges allowed.

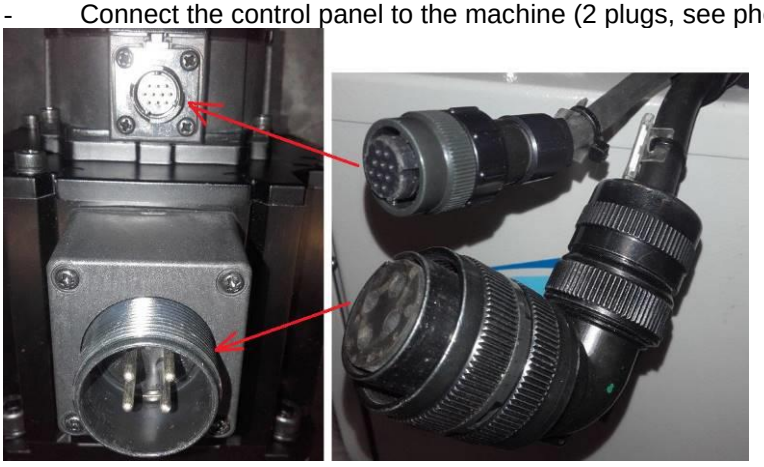
Motor speed range:
- Fitted with a 1:15 reduction gear: 0 to 133 rpm (for a maximum motor speed of 2000 rpm
- Fitted with a 1:25 reduction gear: 0 to 80 rpm (for a maximum motor speed of 2,000 rpm)

Weight of gear motor: ≈ 18 kg
Weight of electrical panel: ≈ 40 kg

Note: Electrical equipment for this option complies with EC and UL standards.

Putting the control panel into operation:

- Connect the control panel to the machine (2 plugs, see photo below).



- Connect the panel to the electricity supply (the characteristics of the supply are described in the technical characteristics above).
- Place the machine on the pipe to be machined as described in paragraph 3.2.
- Put the control panel under power (main switch on the front of the panel).
- The "Power on" light will come on together with the "fault" light on the control panel (the "fault" light will switch off when the motor begins to turn either forwards or backward).

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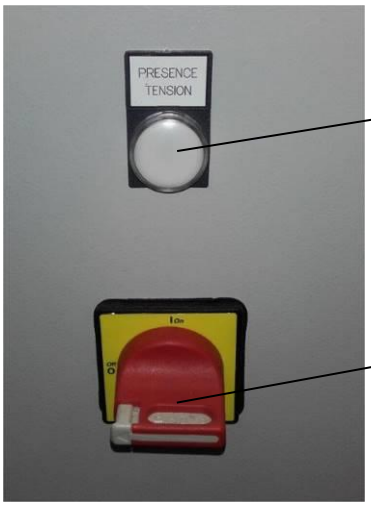

"Power on" light

Main circuit-breaker

- Press the green button on the panel and then press the black "Forward" button.
- Adjust the motor speed by turning the speed control knob on the panel.
- For the machining operation, follow the instructions described in section 3.2.

Tool plate clockwise rotation (machining)

Tool plate anti-clockwise rotation

Stop push-button

Rotation stop

Speed adjustment knob

Control panel Start/Stop switch

Fault warning light

Information: A 2nd emergency stop pushbutton is available. This button is magnetic and can be positioned by the operator close to his workstation.

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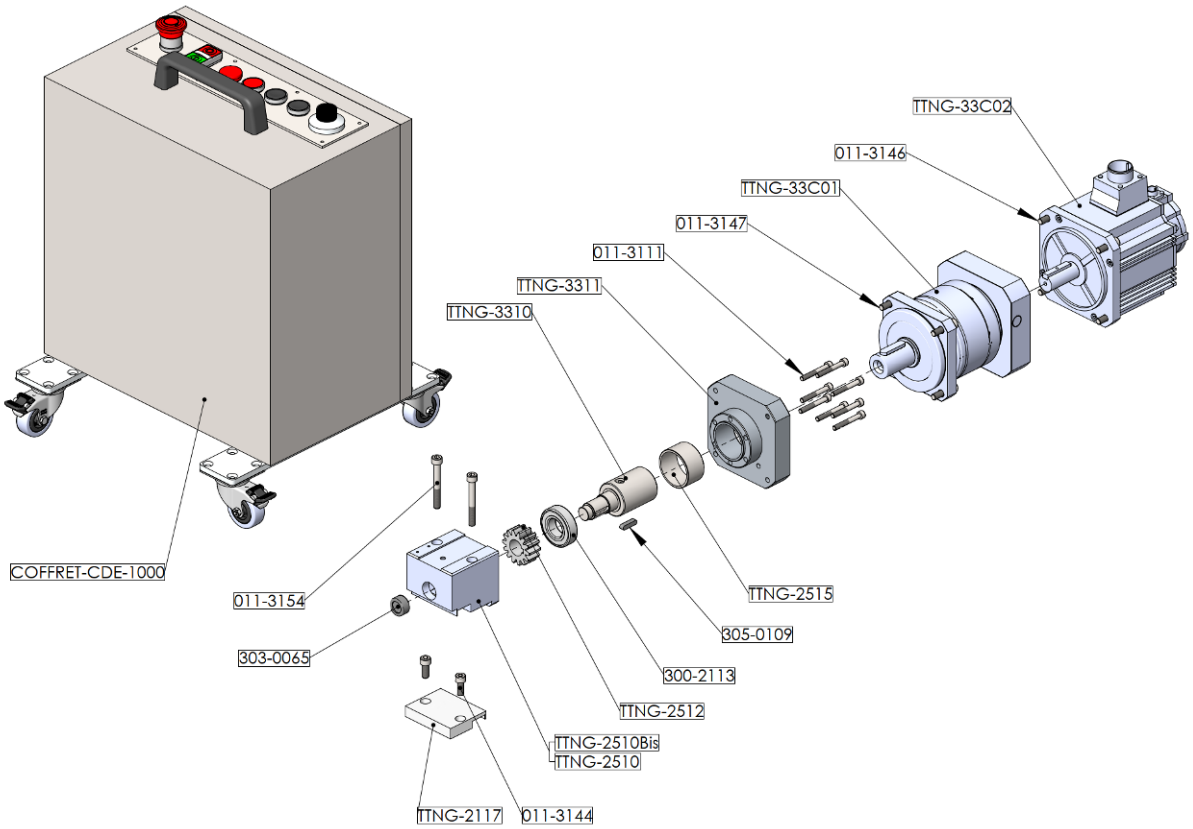
Exploded view of drive 01/21



Ref. Cde / Order Nr	DESCRIPTION	Désignation	Bezeichnung	Qty
TTNG-2117	Drive cover **(from TTNG-406 to 1016)**	Cache motorisation **(pour TTNG406 à 1016)**		1
011-3144	screw **(from TTNG-406 to 1016)**	Vis **(pour TTNG406 à 1016)**		2
TTNG-2510	Motorization housing **(from TTNG-168 to 610)**	Corps de motorisation **(pour TTNG168 à 610)**		1
TTNG-2510BIS	Motorization housing **(from TTNG-762 to 1016)**	Corps de motorisation **(pour TTNG762 à 1016)**		1
TTNG-2512	14-tooth gear	Pignon 14 Dents		1
TTNG-2515	Spacer	Entretoise		1
300-2113	Ball-bearing	Roulement à billes		1
303-0065	Needle bearing	Douilles à aiguilles		1
305-0109	Parallel key	Clavette parallèle		1
011-3154	screw	Vis		2
TTNG-3310	Coupling shaft	Arbre d'accouplement		1
TTNG-3311	Motor bracket	Support moteur		1
TTNG-33C01	Reducer	Reducteur		1
TTNG-33C02	Brushless motor	Moteur brushless		1
011-3111	screw	Vis		8
011-3146	screw	Vis		4
011-3147	screw	Vis		4

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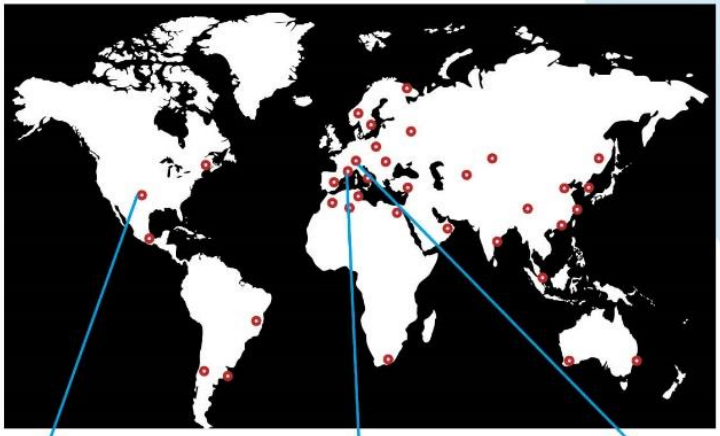
Tube and Pipe machining

World Class Engineered Pipe End Preparation
Construction - Maintenance & Repair - Tubes - Pipes - Flanges - Valves

Reliable - Cost Effective - Modular Design - Light Weighted - Portable

Pipe Facing, Beveling, Counterboring, Orbital Cutting, Severing,
Single Point Machining. Pipeline Machinery,
Equipment For Prefabrication Applications, On-Site Machining



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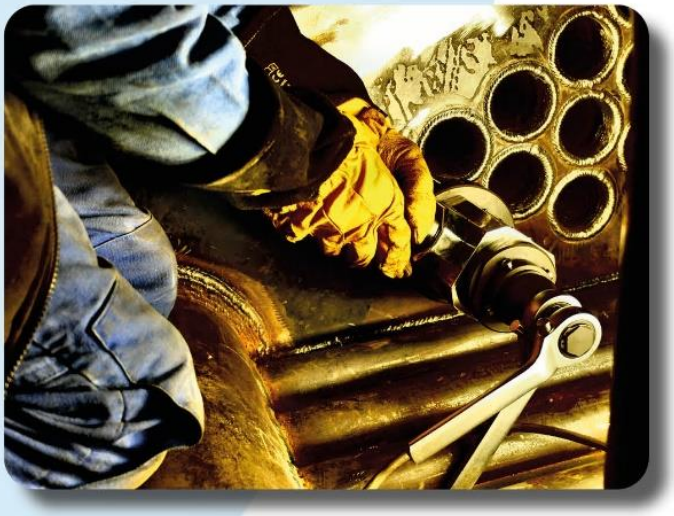
Weld end preparation for tubes and pipes



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A CUT ABOVE THE REST

ID MOUNTED MACHINING EQUIPMENT

SM8 Pipe Beveling Machine
Ø 8 mm - 32 mm
(0.314" - 1.259")

S18 Tube Beveling Machine
Ø 14 mm - 42 mm
(0.551" - 1.653")

S18CA Boilers & Heat Exchangers Tubes Machining Unit
Ø 14 mm - 42 mm
(0.551" - 1.653")

US25CH Boilers & Heat Exchangers Tubes Beveling Machine
Ø 12.7 mm - 120 mm
(0.5" - 4.724")

US25CA Boilers Tubes Beveling Machine
Ø 12.7 mm - 120 mm
(0.5" - 4.724")

US25TP Boilers Tubes Beveling Machine Full Automatic Version
Ø 26 mm - 65 mm
(1.023" - 2.559")

US25TA Pipe Beveling Machine for Fin Tubes
Ø 12.7 mm - 120 mm
(0.5" - 4.724")

US25GL Saddle Beveling Machine
Ø 25 mm - 90 mm
(1" - 3.543")

US30CH Pipe Beveling Machine
Ø 32 mm - 168.3 mm
(1.259" - 6.625")

US40 Pipe Beveling Machine
Ø 43 mm - 273 mm
(1.692" - 10.748")

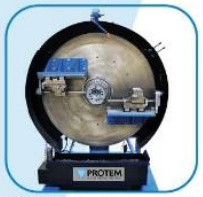
US40CA Pipe Beveling Machine
Ø 43 mm - 273 mm
(1.692" - 10.748")

US80 Pipe Beveling Machine
Ø 80 mm - 406.4 mm
(3.149" - 16")

US150 Pipe Beveling Machine
Ø 150 mm - 610 mm
(5.905" - 24.015")

US450 Heavy Duty Pipe Beveling Machine
Ø 457.2 mm - 1422.4 mm
(18" - 56")

PFM Series Pipeline Machinery - Pipe Facing Machines
Ø 101.6 mm - 1828.8 mm
(4" - 72")



US600-R Pipe Beveler for Very Heavy Wall Thicknesses
Ø 600 mm - 1500 mm
(23.622" - 59.055")

OD MOUNTED MACHINING EQUIPMENT

FBB Elbow Bench Beveling Machine
Ø 33.4 mm - 168.3 mm
(1.31" - 6.6")

OHSB OD Mounted Tube and Pipe Beveling & Facing Machine
Ø 152.4 mm - 355.6 mm
(6" - 14")

US1 Orbital Tube Cutting Saw
Ø 12.7 mm - 168 mm
(0.5" - 6.6")

US3 Orbital Tube Cutting Saw
Ø 5 mm - 88.9 mm
(0.196" - 3.5")

US6 Orbital Tube Cutting Saw
Ø 12.7 mm - 168 mm
(0.5" - 6.6")

UG1 Tungsten Electrode Sharpener & Grinder
Electrodes Ø: 1 mm, 1.6 mm, 2 mm, 2.4 mm, 3.2 mm, 4 mm

SE Series Tube Squaring Machines
Ø 3 mm - 63.5 mm
(0.118" - 2.5")

SL Series Tube Squaring Machines
Ø 3 mm - 120 mm
(0.118" - 4.724")

SE-NG Series Tube Squaring Machines
Ø 10 mm - 219 mm
(0.393" - 8.622")

BMFM Series Tube & Pipe Beveling and Facing Machines
Ø 20 mm - 219 mm
(0.78" - 8.622")

GR Series Portable Beveling and Waterwall Machine for Boiler Tubes
Ø 21.3 mm - 114.3 mm
(0.838" - 4.5")

TTS-NG Series Splitframe Orbital Pipe Cutting & Beveling Machines
Ø 10.3 mm - 219 mm
(0.406" - 8.622")

TTS-TD Series Splitframe Orbital Pipe Cutting & Beveling Machines
Ø 21 mm - 141.3 mm
(0.827" - 5.563")

TTNG-LW Series Splitframe Orbital Pipe Cutting & Beveling Machines
Ø 60.3 mm - 610 mm
(2.374" - 24")

TTNG-HD Series Splitframe Orbital Pipe Cutting & Beveling Machines
Ø 60.3 mm - 4267.2 mm
(2.374" - 168")

TNO Series Heavy Duty Severing & Beveling Machines
Ø 114.3 mm - 1828.8 mm
(4.5" - 72")

MF Series Transportable Tube Cutting & Beveling Machines
Ø 25.4 mm - 406 mm
(1" - 16")

OCM Orbital Cutting and Beveling Machine
Ø 168.3 mm - 1320.8 mm
(6.6" - 52")

BB Series High Speed Pipe Beveling Machines
Ø 25.4 mm - 1422.4 mm
(1" - 56")

CTA Series High Speed Cutting and Beveling Machines
Ø 25.4 mm - 1422.4 mm
(1" - 56")